AMATEUR RADIO

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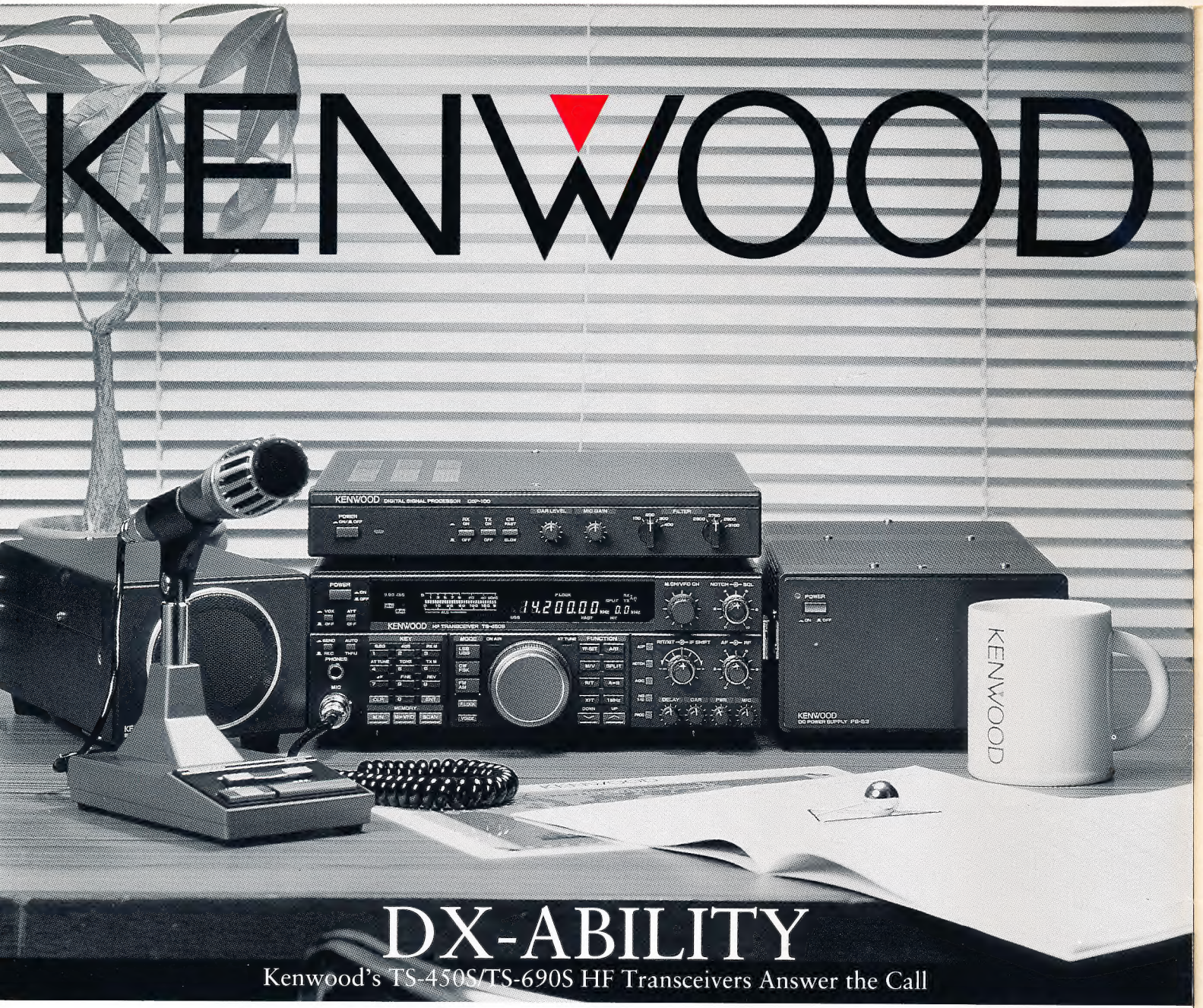
Journal of the Wireless Institute of Australia

IN THIS ISSUE:

A simple 300/1200 Baud-Packet-Radio-Modem
Make your SSB Signal Sound Better
An Effective Junk Box Crowbar

and lots more

KENWOOD



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Cover

Gwen Tilson VK3DYL with her "second op" Rocky and some of her thousands of DXCC cards as a backdrop. Gwen's thumbnail biography appears on page 32.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Federal QSP

Once upon a time there was a land where the people lived happy and contented. Food was plentiful, climate was ideal and it rained when needed. Heart disease, high cholesterol levels, work stress was unknown. But all that changed overnight.

Into this community moved, horror upon horrors, an AMATEUR RADIO OPERATOR. Leaving aside consideration of his wonderful family, his sober habits, immaculate lawns, participating in school fund raising, and his ready assistance to some senior citizens as a handyman whenever required, he actually asked his neighbours if they would mind the erection of a RADIO MAST on his property.

Within a very short time, so many objections were raised against this infernal, aesthetically displeasing, cancer causing radiator, a device which depreciates adjacent land and home values, that he had severe misgivings about the whole community and their attitudes to life.

Pondering on the problem, he asked several questions of his neighbours. Results staggered him. Practically all said they had NO knowledge of amateur radio. Some knew of the Scout Jamboree. One parent even said her son spent a weekend in an adjoining community. He had enjoyed himself and learned some funny expressions like "What is your QTH", and announced that he was going to become a ham as soon as he learned some radio theory and "the code". Two neighbours knew that any radio transmissions were harmful to children!

Well, now he knew the magnitude of his tasks. How to educate the community so they could make a valued judgement on amateur radio. So down through the age groups his programs of education would be given. But where? How? When? (He knew why).

So with BBQs, evening classes at the local senior citizens club and even establishing a school evening class, all at his cost, he made the community aware of amateur radio.

Weeks turned into months and finally two years later he thought it might be time to ask about his radio mast again. Which he did.

Years pass by, community values change — business and making a buck — electronic apparatus of all kinds invade the home — council bylaws control everything — except in circumstances where the real big dollar is seen to dominate. Telecom and OPTUS erect Towers. High voltage pylons arch across and through the suburbs, solar water heaters and AIRCON units appear on home roofs. Two storey homes appear, and the occasional satellite dish is seen. Marine craft are moored on street verges, along with sundry trailers and caravans.

The neighbour up the street leaves at 6 am in his 10 tonne truck which certainly doesn't like starting, let alone grinding its way up the hill. At least he is regular, you can then lie awake waiting for your alarm to go off a little later.

And into this area moves a new amateur, knowing he must do everything correctly. He applies to the council for a building permit to erect his 6 (yes 6) metre mast. What do

you think the answer from the council would be, and on what grounds?

You were wrong! Council wouldn't approve because the electricity supply authority had put the power reticulation to the homes in his area underground.

If you have been looking for a moral, or how to get council approval, sorry. As our numbers stand, the figure is 1 in 1000 population. However, most of the applications to erect a radio mast (not tower), seem to succeed. Enlist the aid of those who have been through it all, seek help from your local radio club and WIA. Above all have some dialogue with your neighbours (does he/she like Guinness, Johnny Walker, unleaded, leaded, or ultra high strength ale?).

There seems to be no solution to the neighbour who admits amateur radio is a great hobby, his sons enjoy JOTA, thinks the local radio club participation in search and rescue commendable, but says no to your need to erect a mast.

Because it will cause TVI, and that is the end of it.

This hasn't been the usual type of QSP. It wasn't intended to be.

If past and present accomplishments of amateurs/hams are looked at and acknowledged then we should be able to conquer our problems, whatever they may be.

Like retaining our membership.

Neil Penfold VK6NE
Federal Vice President
ar

Editor's Comment

Divisions

You may not have noticed its absence, but this is the first "Editor's Comment" since last March. There has been a "Federal QSP" to keep the flag flying in the meantime, but your humble editor has refrained from "comment" for seven whole months!

It has now been decided that both a *Federal QSP* and an *Editor's Comment* will appear from now on, so my little holiday is over! Of course, the magazine has kept me rather well occupied in other ways in the

Continued on page 51

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts		1993 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Hugh Blemings Don Hume	VK1DO VK1YYZ VK1DH	3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Fax (02) 633 1525	President Secretary/ Treasurer (Office hours	Terry Ryeland Roger Harrison Mon-Fri 11.00-14.00 Wed 1900-2100)	VK2UX VK2ZTB	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24,950, 28.320, 52.120, 52,525, 144.150, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay via a local 2 metre repeater. Sunday 1000 and 1915. Highlights included in VK2AWX Newcastle Monday 1930 on 3.593 plus 10mx, 2mx, 70cm, 23cm. News headlines by phone (02) 552 5188. Some broadcast text can be found on the Packet network.	(F) (G) (S) (X)	$66.75 $53.40 $38.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours	Jim Linton Barry Wilton Rob Hailey Tue & Thur 0830-1530	VK3PC VK3XV VK3XLZ	1.840MHz AM, 3.615 SSB, 7.085 SSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Mildura, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.	(F) (G) (S) (X)	$72.00 $58.00 $44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Secretary Treasurer	Ross Marren Lance Bickford David Travis	VK4AMJ VK4ZAZ VK4ATR	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Bob Allan Maurie Hooper Bill Wardrop	VK5BJA VK5EA VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555m 146.5000, 0900 hrs Sunday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 388 3888	President Secretary Treasurer	Cliff Bastin Bruce Hedland-Thomas	VK6LZ VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.	(F) (G) (S) (X)	$60.75 $48.60 $32.75
VK7	Tasmanian Division 148 Derwent Avenue Lindisfarne TAS 7015 Phone (002) 43 8435	President Secretary Treasurer	Andrew Dixon Ted Beard Peter King	VK7GL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) (G) (S) (X)	$67.00 $53.65 $39.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).						

Note: All times are local. All frequencies MHz.

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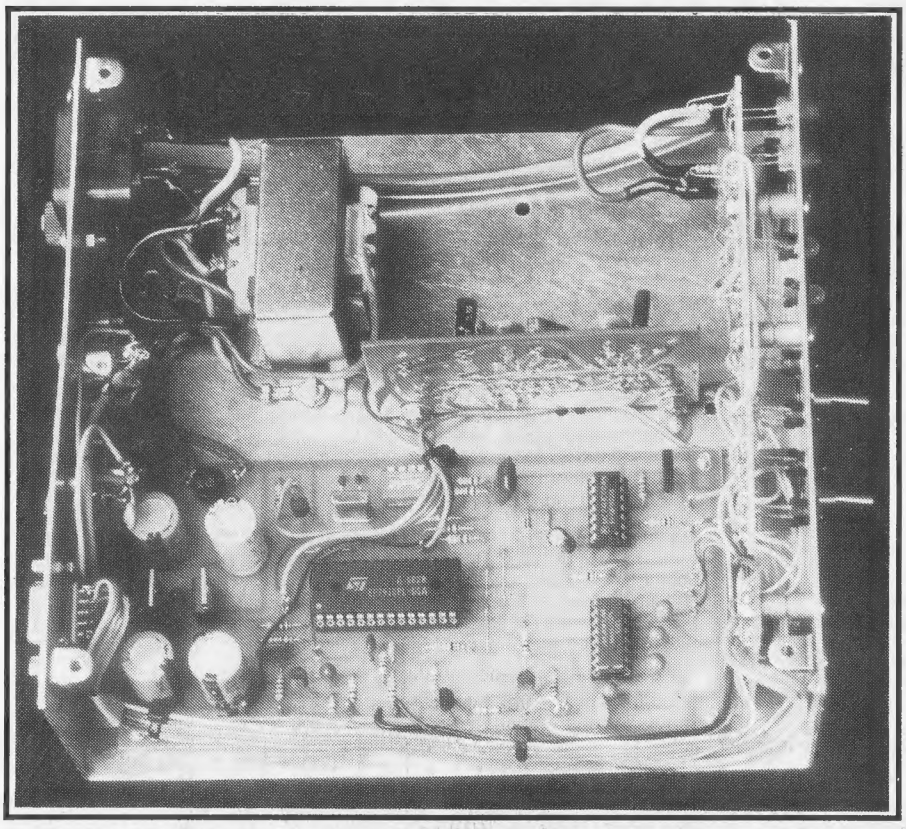
A Simple 300/1200 Baud Packet Radio Modem

*Lou Destefano VK3AQZ * after an unusual introduction to Packet Radio, now solves another problem.*

Just recently, I purchased the Pocket modem designed by Tom Moffat. This is a software TNC using Baycom or similar software and operating at 1200 baud. This baud rate is satisfactory for 28 MHz and above but not for HF packet. Although the Pocket modem is excellent for its intended application, it cannot be made to work at 300 baud. The TCM3105 chip can handle just about any baud rate, except 300. However there is a chip readily available that can handle 300 as well as 1200 baud. This is the AMD 7910 world-chip which can be programmed for Bell 103, Bell 202, V.21 and V.23. The disadvantage of this chip is the requirement for a + and — 5 volt supply and the rather heavy current consumption of around 150 mA.

The circuit diagram of a dual baud rate modem using this chip is shown in Figure 1. The design is nothing really original and the basic circuitry is very similar to the TCM3105 modems such as Baycom, Poor Man's Packet, Moffat's, and a variety of other published circuits including ones using the 7910 chip. Most of the hard design work has been done by the chip manufacturer and there is only limited circuit variation possible external to the chip. The purpose of this article is to introduce to the reader, a software TNC modem suitable for both HF and VHF packet radio.



Side View of Modem showing main PCB, tuning indicator board, and rear of front panel.

Circuit description

The 7910 modem chip is capable of receiving and transmitting FSK audio tones for a variety of modes which can be selected by applying the appropriate logic level at inputs MC0 to MC4 (pins 17 to 21). It can also be programmed for "loopback" mode. When using Bell 103 mode, the transmitted data is sent using one pair of audio tones whilst the received data uses a second pair of tones. If the sending modem is in the "Originate" mode, a space generates a 1070 Hz tone and a mark, a 1270 Hz tone. A modem in the "Answer" mode will reply with 2025 Hz for a space, and 2225 Hz for a mark. This enables duplex operation over a phone line. For amateur packet operation, the same pair of tones are used for both transmit and receive. Fortunately, the 7910 is able to transmit and receive on the same pair of tones at 300 baud by using the "loopback" mode, which was incorporated in the chip for test purposes. Loopback is selected by a logic high on pin 21 (MC4 input).

Bell 202 mode (1200 baud), uses the same tone pairs for transmit and receive with a back channel at 5 baud for the reply. An SPST switch wired to pin 18 of the 7910 selects either 300 baud or 1200 baud mode. The other 4 pins are programmed with a 4 pole dip switch on the pcb. If you prefer, this switch can be left out and wire links used instead. However, if you leave the switch in, you can experiment with some of the other modes. These are briefly described on the circuit drawing . For those interested, more information is detailed in the manufacturer's data sheets.

Input/Output Circuits

The received audio tones are fed into the modem via DIN sockets from the HF and VHF rigs. A set of small trimpots is used to adjust the receive and transmit tone levels. These trimpots are located on a small piece of matrix board mounted behind the front panel with small LED plastic bezels for neatness, and as screwdriver guides. In my set-up, audio from the HF rig (IC720A) is taken from the multiway connector at the rear and is independent of the front panel volume control. The

transmit audio also enters the rig via the rear connector but still utilises the front panel Mic gain. The HF TX trimpot is set so that the transmitted power is roughly correct with the Mic gain control at the same setting as for voice. This modem transmits packet data as audio FSK and is fed into the transmitter audio input circuits. This method of transmitting FSK has limitations in that over-driving the audio input can generate unacceptable distortion products.

The setting of the transmit audio level needs to be carefully done by listening on another receiver, and ensuring the transmitted tones are relatively clean. Do not overdrive the rig in an attempt to get more apparent power, and definitely do not use a compressor. Use of an RTTY input, which directly controls an oscillator frequency, is a much better way of transmitting packet data. For packet operation, the frequency shift of this RTTY facility should, in theory, be reset for 200 Hz shift.

The audio take-off point at the rear connector of the IC720A has a relatively high impedance necessitating a 10 k trimpot for VR2 to minimise the loading. For the VHF rig, the audio is derived from the speaker output. As for HF, the transmit audio tones are fed into the Mic input. VR3 is used to adjust the TX tone level and is set for a reasonable level of tone modulation without going into too much clipping.

Use of an RTTY input, which directly controls an oscillator frequency, is a much better way of transmitting packet data.

In this case, the setting is not as critical as for the HF rig. Listening on a second rig whilst adjusting VR3 will give you a good idea of the quality.

The selection between HF and VHF is made via S1a, b, and c. As 1200 baud is also used on 28 MHz, the 1200/300 baud selection could not be incorporated into this switch if full versatility was to be maintained. For receiving packet tones, the appropriately selected audio is fed into a small 10 times amplifier so as to increase the level up to around 200 mV RMS. This amplifier stage is really only needed for the IC720A, which only gives 50 mV from the rear connector. On the other hand, the VHF rig speaker output supplies plenty of signal and may be too high if the receiver volume control is wound up.

This transistor amplifier also feeds a simple tuning indicator which I have incorporated into the modem. This indicator is only needed for HF packet. It is an essential addition if you want to spare yourself the pain of trying to tune in HF packet signals without one. The received tone frequencies for HF packet have to be tuned very accurately. The difference in frequency between the two tones is only 200 Hz and the exact tones are very difficult to pick by ear. If you alter the receive tuning during the short packet burst, you will not receive an output from your packet display. As the bursts are short and random, it can take considerable time before you fluke a correct decode.

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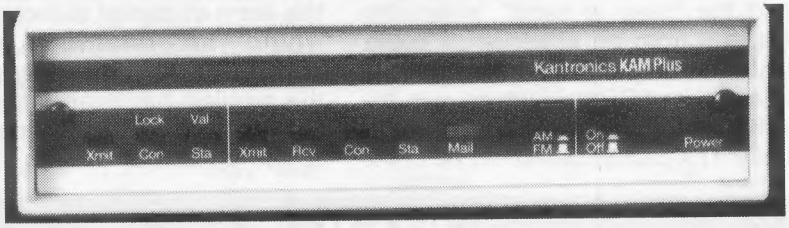

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The tuning indicator I used is one designed by Garry Cratt and was published in Silicon Chip, April 91. It uses a pair of NE567 tone decoders each driving an LED. The NE567 is a PLL tone decoder and can be set up as a very selective tone detector. In this design, one chip is set for the space tone, whilst the other is set for the mark tone. The bandwidth of these detectors is very narrow resulting in an accurate packet tuning indicator. In operation, the rig is carefully tuned (in 10 Hz increments if possible) until both LEDS flash with packet data. If you intend using this design, I would strongly recommend the use of small 10 turn trimpots, or resistive padding, for setting the tone detector frequencies. The single turn trimpots are a little too touchy for the close spaced packet tones. The audio level required to drive this indicator is at least 200 mV RMS.

With regards to the reception of packet data by the modem, the software I am using waits for the activity on the data receive line to stop before it starts to send data out. On VHF, this occurs once the squelch operates and mutes the audio out of the rig. This in turn quietens the receive data line and the software knows it can send if required. On HF, there is no receiver squelch as such, and the "okay to send" is actually initiated from an absence of audio. Unfortunately, on HF, there is plenty of noise and QRM which causes the software to think that the channel is busy. The carrier detect circuit in the 7910 indicates a busy channel with a moderate level of noise.

In order to work successfully on HF, I have found it necessary to turn the RF/IF gain control down so that the packet data is recovered but the noise is low enough to allow transmission. Adjusting the pass band tuning also helps significantly. The modem really needs a packet detection system that ignores the noise and QRM. Some of the commercial units use an XR2211 as a PLL detector which then acts as a form of squelch if the correct tones are not received. In my particular modem, I have noticed that the tuning indicator LEDS do not come on very easily with noise alone. It really needs valid audio tone for the LEDS to come on. Although at this stage I have not tried it, it may be possible to derive a squelch type signal from the tune indicator output LEDS. This squelch could drive a transistor switch across the wire sending data to the computer.

As each LED flashes alternatively depending on whether it is receiving a space or mark tone, a one bit delay is needed. The voltages driving the two LEDS would then be "OR-ed" together, inverted, and applied to the squelch transistor. As most of the circuitry is already in the modem for this form of carrier detect system, it would be relatively easy to implement. An interesting article on this problem has been written by Eric S Gustafson, N7CL, presented as one of the papers at the 7th Computer Networking Conference published by the ARRL.

The Computer Interface

The 7910 is driven by the computer via an RS232 interface chip. The particular software I am using is Graphic packet which is written for an IBM PC, or compatible, and makes use of the serial RS232 ports. Other software is available which can connect to a Commodore computer, or use the parallel interface. In my case, I am catering for an RS232 serial port, and thus I have used the versatile MAX232 chip. This chip has two TTL to RS232 converters plus two RS232 to TTL converters. In addition, it operates from a single 5 volt supply and internally generates + and — 12 volt RS232 signals. Alternative drivers are the 1488/89 chips but these require dual supplies, as well as stabilising capacitors. The single MAX chip does it all in one hit.

Some of the TCM3105 designs use standard MOS chips with high value series resistors to overcome the problem of blowing the chips up with the negative RS232 voltage swings. That's fine for short leads but unsuitable for longer cables and HF where high power rf can enter the connecting cables. The MAX chips have much lower input impedance and are thus more immune to interference. Whilst talking about HF applications, because of the powers involved, and the sensitive receive requirements, the use of well shielded leads and a metal box is a must.

The MAX chip drives the computer via a DE9S (Female) connector and uses the same pin numbers as the Moffat modem for compatibility. If your computer uses a 25 pin serial port connector please note that the function of the pins in the DE9 is not standard. If you purchase a standard 9 pin to 25 pin adapter or cable, you will have to rewire the cable. The connections are shown below :-
Note: The power function on pin 3 is only used in the Pocket Packet modem.

Function	DE9	DB25	Normal use
Tx Data	4	20	DTR
Rx Data	8	5	CTS
Ptt	7	4	RTS
Gnd	5	7	
Power	3	2	TXD

WIA News

Good publicity for amateur radio

It always pays to publicise your club's activities, and keeping in contact with the local newspapers in your club's area can pay dividends.

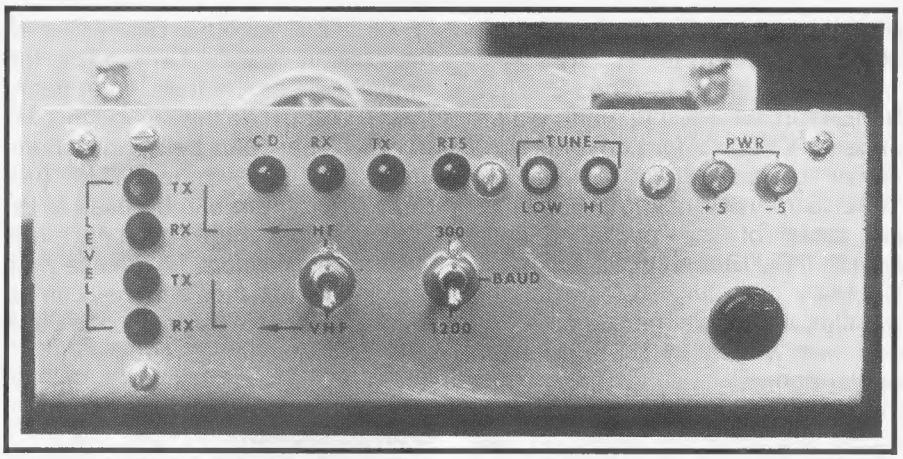
In August, when the Glen Innes and District (NSW) Amateur Radio Club opened its new headquarters at the town's railway station, the *Glen Innes Examiner* went along.

The result was a charming picture in the paper the next week and a short, complementary story about the club and the hobby of amateur radio.

The picture showed foundation member, Ivan Botha, with his wife and baby daughter with the amateur equipment at the club's new headquarters.

Well done, Glen Innes and District Amateur Radio Club.

Such publicity keeps the hobby of amateur radio regularly before the public and helps dispel the many myths that abound about the hobby as well as to distinguish hams from CBers.



Front view of Packet Radio Modem.

In addition to the interface chip, a watchdog timer circuit is included to shut the transmitter down should a fault develop during unattended operation. This circuit is similar to other designs and works quite well. In some designs, an additional muting circuit is applied across the transmit audio output of the 7910 (pin 8). This muting is applied at the end of the packet data stream or when the watchdog timer activates. The rest of the circuit contains a simple dual supply and some LED indicators which display various modem conditions. Apart from the vital tuning indicator LEDS for HF packet, the rest of the LEDS can really be left out if you wish. If you decide to incorporate them, the LEDS flash away quite nicely during operation and can be entertaining to watch if nothing interesting is coming through on the screen.

With regards to the power transformer, I used a low cost ($4) unit from Radio Parts rated at 300 mA. The particular unit I purchased was a multi-tap one but it did not have a centre tap at the voltage I wanted. However in this application it does not matter too much. If you are able to, it would be better if you could use a 9 V — 0 — 9 V transformer.

Software Considerations

The modem uses software which performs the TNC functions as well as the terminal facility. I have been using Graphic Packet (V1.21) by Ulf Saran (DH1DAE) which makes use of attractive icons, and is very user friendly. Graphic Packet uses a TNC program called TFPCX by Ren Stange Y51GE. This software has been put in the public domain by the writers for use by amateurs, providing no commercial gain is made. All this software is for use with an IBM PC. I am using a 386 computer but the software can be used on a 286 and an XT. I have not tried it on an XT so I cannot comment on its use here. Other software, such as Baycom and SP, can also be used. SP and Baycom have a more basic screen display and appear very similar to each other. SP also uses the TFPCX software for the TNC function.

An important requirement of the software is the ability to configure it for both 300 baud and 1200 baud. I have both GP and SP working at both baud rates very successfully. Baycom V1.5 can be made to work at 300 baud by using the TNC command": HBAUD 300" after loading Baycom.

With regards to GP, I have two configuration files. One is set up for 1200 baud and I have named it CON1200.GP. The other is set up for 300 baud and is named CON300.GP. I boot up GP via a small batch file, and again I have two of these.

The 300 baud batch file is called GO300.BAT and the first line does a file copy from the 300 baud config file into CONFIG.GP, which is the file name GP looks for when it starts. The next line of the batch file does the same thing with the TFPCX part of the software which also needs to be configured according to the baud rate, as well as cater for some slight differences in TNC parameters. When working HF packet, some TNC parameters such as the TX delay time, the number of retries, and so on, need to be fine tuned. Having two separate configuration files allows you to experiment with these parameters.

At this stage I must say I am still learning about HF packet and my set-up is probably not right yet. In addition to the copying of the specific configuration files, the batch file then loads the TFPCX software. When loading TFPCX, you can specify certain parameters such as which comms port you are using, the baud rate, and a switch which tells it to look for a specific initialisation file called TFPCX.INI. The next line then loads the Graphic packet running file called GP286.

For XT computers I believe you load GP in lieu of GP286. The last line of the batch file unloads TFPCX from memory after you exit GP. TFPCX resides in about 40k of RAM and runs in the background. In fact, with GP, you can exit to DOS via GP's DOS exit icon, and carry out other tasks on the computer whilst GP looks after any packet traffic.

For illustration, the 300 baud and 1200 baud "GO.BAT" files are shown below:-

```
    GO300.BAT
    Copy Con300.gp Config.gp
    Copy Tfpcx300.ini Tfpcx.ini
    Tfpcx -pcom2 -b300 -f
    GP286
    Tfpcx -u
GO1200.BAT
    Copy Con1200.gp Config.gp
    Copy Tfpcx120.ini Tfpcx.ini
    Tfpcx -pcom2 -b1200 -f
    GP286
    Tfpcx -u
```

The TFPCX initialisation files are as follows:-

```
TFPCX300.INI
    ^T 100
    ^VK3AQZ
    ^F 5
    ^Y 5
TFPCX120.INI
    ^T 100
    ^R 1
    ^I VK3AQZ
```

In the TFPCX.INI files, the " ^ "is interpreted as an escape character and is used to signify a TNC command. "T" is the parameter for TX delay, and in my case is 100 msec. "I" sets up your callsign. "R" turns on the digipeater function. "F" is the

delay time for an answer in seconds, whilst "Y" specifies the maximum number of connect tries (default is usually 10). There are many other parameters you can play with. I am still learning in this area and have only scratched the surface.

When selecting either 300 or 1200 baud, it may be possible to do this from within GP itself. At this stage I have used the easy way out as above. The GP software is still a bit of a mystery to me. Up to just recently, the only documentation I had for GP was in German. I have to say that in the last month or so I think I learnt to read a significant number of German words! It's amazing how quickly you learn when you have to — particularly when your packet station automatically sends connect text or the "help" list in German! The ability to run both baud rates simultaneously with two comms ports, and dual modems would allow HF/VHF digipeating which I guess is something to aim for in future.

With regards to the English translation, we need to thank Waldis Jirgens, VK2DXV for converting the 40 or so pages into English. A "7PLUS" version of this document is on some of the packet bulletin boards. 7PLUS is an intelligent ASCII to binary encoding scheme for the transfer of files over packet networks and was written by DG1BBQ (also public domain for amateurs). It has the facility to correct for transmission errors and generate correction files which can be sent back to the source for re-transmission of just the missing bits. GP has an automatic 7PLUS file transfer system built in. Please note, however, that you need the 7PLUS program to convert the file back to its original condition. This 7PLUS program is not included with GP.

One thing I have not been able to do with either SP or GP, is down load "EXE", "ZIP" or other binary files on the bulletin boards. On reading the English documentation, it appears that GP cannot do this, although it will transfer binary files between stations using GP. I believe the B-YAPP (not YAPPB) program can be used to do this but at this stage I can only make it work with Baycom 1.5. Please note that normal text files and mail can be read and saved using the GP text save facility.

Construction

The construction of the unit is straightforward. I originally built it "rat's nest" style on an old 7910 modem board designed for phone lines and it worked okay. I don't believe the layout is very critical and it could probably be built on matrix board. I have built mine on a single sided pc board using the Protel software to lay it out. There are only

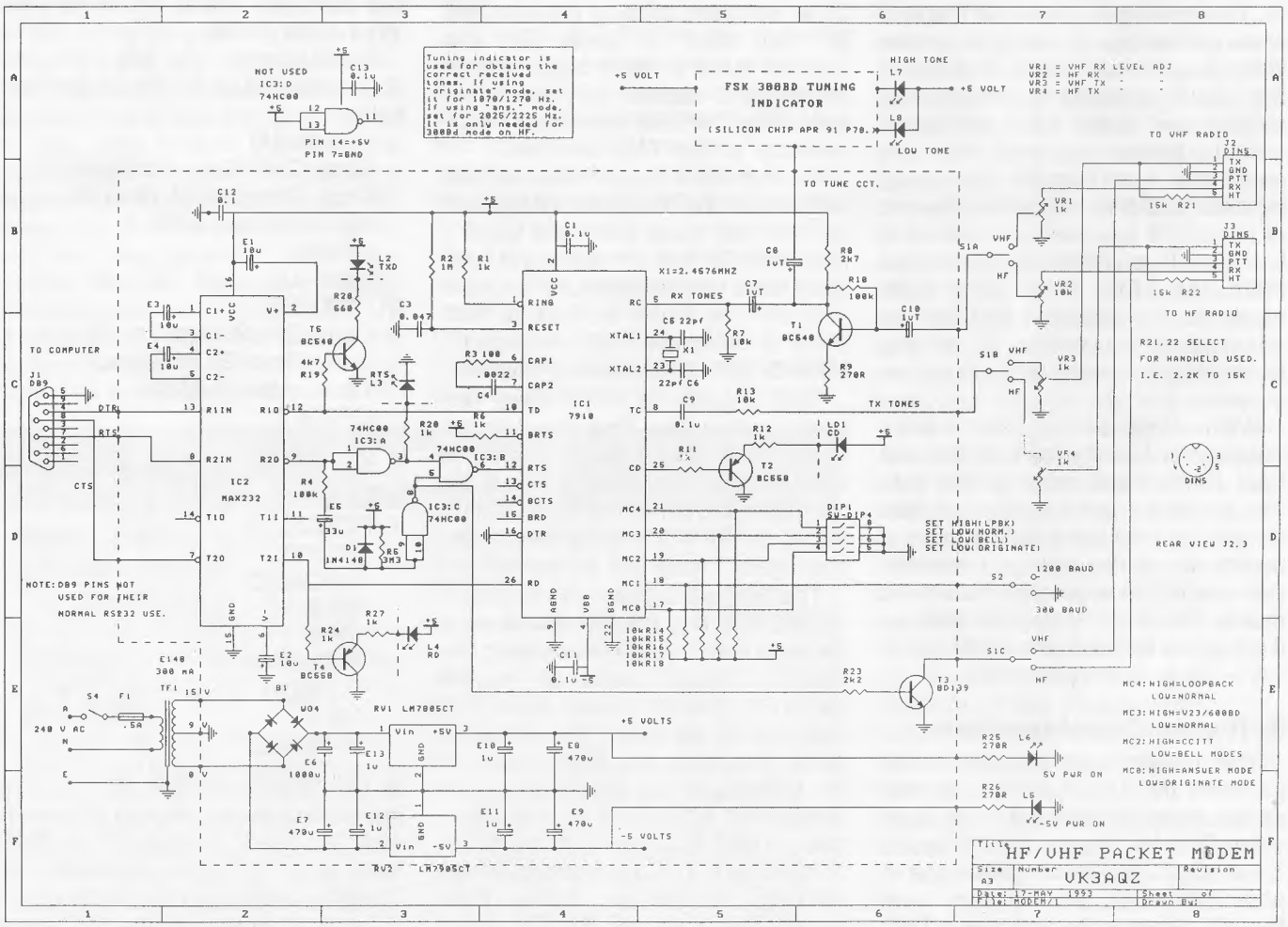


Figure 1 — Schematic Diagram, HF/UHF Packet Modem.

three links on the top and the in/out pins were placed around the board where it suited. Take careful note of the orientation of the electrolytic capacitors around the MAX chip. If anyone would like a Protel PCB file, I can supply it, providing you send sufficient to cover postage and disc costs.

The case must be metal and earthed to reduce interference. Mine is made out of 2 pieces of 16 gauge aluminium bent as matching upper and lower "U" pieces. Size is 7" by 7" by 2.5" high (180 × 180 x 64 mm). I placed a couple of 0.001 μF ceramic disc capacitors from the TX audio pins of J2 and J3 to earth as a precaution against RF feedback. Ferrite beads were also put over the wires joining these pins. Also, some handheld radios use a resistor to ground from the TX audio input to activate the PTT. These can be wired to the rear of J2 and J3 for convenience. To use these resistors, you need to join pins 5 and 3 in the mating plugs. This joins the PTT output from T3 to the bottom of the resistor only when the appropriate cable is plugged in. I use an FT470 and found that 2.7 k is required. I have shown these resistors on both sockets which allows you to use the HF socket for a handheld on 70 cm. Motherhood statement — don't leave out the mains fuse, wire the mains correctly to the switch, and use plenty of heatshrink for safety. Do not use a power cord without an earth if you use an all-metal box.

The tuning indicator is powered from the +5 volt rail. Referring to the original Silicon Chip article, the 8.2 V zeners are left out and the 120 ohm series supply resistors are reduced to 27 ohm. The input coupling capacitor is increased to a 1 μF tantalum.

Alignment

The alignment of the modem is relatively easy. The receive levels into the 7910 are set with VR1 for the VHF rig and VR2 for the HF rig. Starting with the VHF circuit first, set the rig's volume control at about the level you normally use for voice, and with the trimpot wound right down, slowly bring it up until the software starts to decode packet reliably. Once you find this spot, you can turn VR1 up a little more and leave it. Do some tests with noisy signals and see how well it can decode. I found the 7910 very good under noisy conditions and it seemed to be better than the TCM3105. The application notes for the 7910 indicate that the receive circuits contain both analogue and digital filtering. In addition, on 1200 baud, it contains an inbuilt equaliser which can be activated by putting MC0 at logic high. This pin has a dual role.

The alignment of the modem is relatively easy.

When 1200 baud is selected, setting it high turns a receive equaliser on. In the 300 baud mode, it selects whether you are in originate or answer mode. I did not find much difference between equaliser on or off so I have not used that facility. However the difference between originate and answer at 300 baud is very significant as it determines the tone frequencies.

Aligning the HF receive is more difficult as it requires you to have tuned the rig to the correct tones. To start with, set VR2 sufficiently high to activate the carrier detect LED. Then, using the tune indicator circuit, tune carefully till you obtain a correct decode. Once you find the correct receive frequency for the signals, adjust VR2 up and down, noting the point at which the signal will no longer decode correctly. The 7910 is able to withstand a reasonable level of input signal, so once you have sufficient for decoding, you can advance it somewhat higher.

The tune indicator works at its best when it is fed with at least 200 mV rms and so this needs to be considered when setting VR2. The alignment of the tune indicator is as per the Silicon Chip article. Briefly, the trimpots for each NE567 are set with a frequency counter on pin 5 of the NE567's and the 22 k trimpots are then adjusted for the mark and space tone frequencies (with no input signal applied). The tone frequencies you adjust for depend on whether you use "originate" or "answer" mode.

When tuning in a packet signal, or any FSK signal with a sideband receiver, the resulting audio output frequencies will depend on the beat between the BFO and the incoming signals which represent the mark and the space RF carriers. If an SSB transmitter is fed with audio tones from a modem set up for originate, it will receive into its Mic circuit a 1070 Hz for a space and 1270 Hz for a mark. If the transmitter dial is set at exactly 14.100 MHz, then this frequency represents the frequency of the suppressed carrier. If the mode of the transceiver is lower sideband, then only the lower sideband components of the modulation will be output (due to the sideband filter).

This means the modem audio tones for originate mode would appear at 1070 Hz (space) and 1270 Hz (mark) below 14.100 MHz. Similarly, if the upper sideband mode is selected, the tones will be correspondingly above the nominal

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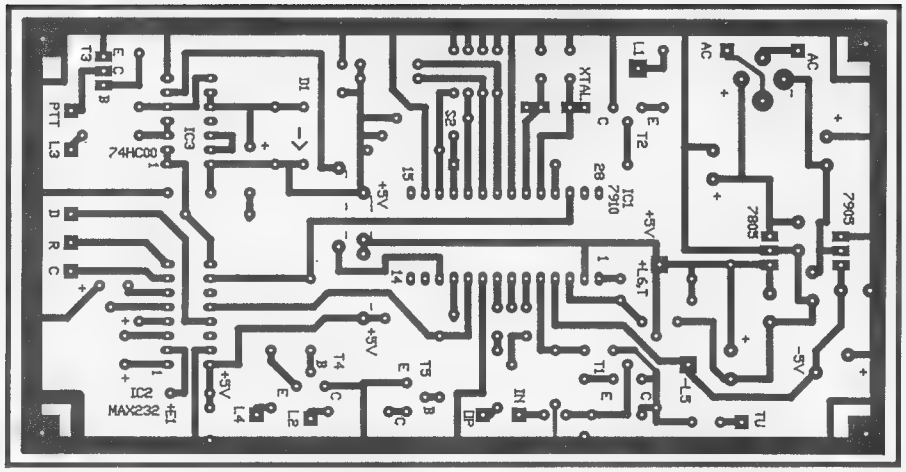

Figure 2 — Modem bottom layer, copper side view.

14.100 MHz carrier frequency. In both cases there will be two signals radiated which alternate on and off and are 200 Hz apart. Their absolute frequency depends on whether USB or LSB is used. Therefore, in the above example, we will have, whenever a space is sent, a signal at 14.100 MHz minus 1070 Hz, and when a mark is sent, a signal 1270 Hz below 14.100 MHz. A bit like two CW signals that are taking it in turn and 200 Hz apart.

If a receiver now comes across these two signals, and it is switched to the LSB mode, the frequencies that appear at the audio output of the receiver depend on the beat between the BFO and the two signals. When the tuning dial of this receiver reads exactly 14.100 MHz, the tones will be as above. If, however, the tuning dial is set at 14.101 MHz (ie 1 kHz higher), the tones will also be 1 kHz higher and appear as 2070 Hz and 2270 Hz. If the receiver happens to have a modem on the end of it which is switched to the answer mode, the two frequencies received are almost the same as those used for 300 baud in the answer mode and will thus decode as valid marks and spaces. In fact, at exactly 955 Hz above 14.100 MHz, the correct tones for 300 baud "answer" mode will result (ie 2025 Hz for a SPACE and 2225 Hz for a MARK).

Taking it a step further, if the operator of this receiver now switches his modem to originate mode, he will no longer decode the packet data whilst he is tuned to 14.100955 MHz. If he now re-tunes his receiver down by 955 Hz to 14.100 MHz, he will again begin to decode the data correctly. So, in essence, it does not really matter if you are in originate mode or answer mode when receiving packet providing you understand how to read your tuning dial and adjust accordingly.

The essential thing is that the BFO beats with the incoming signal to produce the correct tones for the modem setting. A similar effect happens if the receiver in the above example is switched to USB. In this case the space and mark tones will be reversed and the dial reading, which represents the suppressed carrier frequency, will read lower than 14.100 MHz by the amount of the higher tone frequency (which decodes as the lower tone, if you follow!).

If you draw the above out as a spectrum representation showing the suppressed carriers, it will all become clear — I hope!. I understand that the convention on the 20 m band is to use LSB. In my case I have elected to use the modem in the originate mode which means that the audio tones are 1070 Hz and 1270 Hz. This means my tuning indicator has the two tone detectors set for responding to these two tones. So if the tune LEDS are flashing I know I am receiving 1070 Hz and 1270 Hz.

I don't take much notice of the tuning dial (other than to make sure I am in band), but I do know it is reading correctly if the sending station is using originate tones, and 955 Hz low if they are using answer tones. The important thing is the 200 Hz difference, not the absolute frequency values. This effect, if you can call it that, is a result of using single sideband radio equipment, and is not applicable to telephone baseband usage.

In my particular case, I am using the originate mode as the tone frequencies are lower and thus more easily handled by the narrower SSB filter in the rig.

The transmitter alignment is fairly straight forward. The correct tones are automatically generated on transmit by the 7910, depending on the chosen mode. With the pocket modem software, there was a very handy alignment program which generates spaces, marks, or reversals. Using this program, I was able to set the levels into the two rigs whilst listening on another receiver. The transmitters are feeding dummy loads during this process. It can also test if the watchdog timer is working as well as the PTT circuit.

The modem can also be checked and aligned at the computer connector (J1). First put a logic high on the PTT activating circuit. This is pin 7 on J1 and is called RTS. I did this by taking this pin to +5 volts via a small switch. The switch is needed to reset the watchdog timer which turns things off after 30 seconds or so. Strictly speaking, logic high at J1 should really be +12 volts as we are dealing with RS232 levels here. However, +5 seems to work today.

Pin 4 of J1 (DTR) is the pin which takes transmitted data from the computer and feeds it to the modem for generating the transmit audio tones. We need to check that RS232 highs and lows produce the correct tones. A logic low on pin 10 (TD) of the 7910 generates a space tone whilst a logic high generates a mark tone. Between J1 and pin 10 of the 7910 there is a logic inverter, which is one of the buffers in the MAX chip. Therefore, the logic at J1 pin 4 is reversed. During operation the software takes this reversal into account.

So, bearing in mind the above, if you put +5 volts on pin 4 of J1, you should obtain at pin 8 of the 7910 the tone for a space and for a logic low (−5v), the mark tone. The frequency of the tones depend on whether you

are using the answer or originate modes. In the originate mode you should get 1270 Hz for −5 V and 1070 Hz for +5v, and in the answer mode you should get 2225 Hz for −5 V and 2025 Hz for +5v. For 1200 baud mode you should get 1200 Hz for −5 V and 2200 Hz for +5 V with no difference between originate and answer.

Addendum

The foregoing packet modem design requires a modification to prevent some handhelds going into transmit when the TX audio plug is inserted into the Mic input of the handheld. A small mono block or similar capacitor of around 1 μf needs to be inserted between pin 1 of the 5 pin DIN socket (J2) and the top of VR3. This capacitor provides DC isolation for HTs which go into transmit when a resistor is placed between the external Mic input and ground. Unfortunately, the value of VR3, being only 1 k, is too low for some units and causes the HT to go into transmit all the time. The HT should only transmit when the Mic input is earthed via R21 and the TX switching transistor, T3.

References

1. The "Pocket Packet modem", T. Moffat, Electronics Australia, Jan '93.
2. ARA super modem, T. Tregale & K. Summers, ARA Vol. 10 No. 1
3. An LSI Modem for Amateur Radio, ARRL Handbook 1986, Chapter 29.

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WIA News

Is this a record net?

The Coral Coast Group may be the longest running net in Australia, or perhaps the world, according to Les Daniels, VK2AXZ. It has been running 7 days a week since it was started by Les Bell VK4LZ in September 1967.

The dedication and enthusiasm shown by Les Bell and his wife was acknowledged by the Coral Coast Group, on the silver anniversary of the foundation of the net, with the presentation of a plaque to Les.

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SSB and Audio Quality

*Jon Lindstad VK2WF * describes how to make your SSB signal sound better.*

Comments and discussions about microphones, overheard on the HF bands, have made me believe that the basics of SSB signal generation and the factors that affect the audio quality of an SSB signal are poorly understood by many. Problems with "dull" or "tinny" audio quality, and distortion, are often blamed on the microphone although the problem in most cases lies somewhere else. This article is aimed at the novice, but I suspect that it could benefit the odd old-timer as well.

Fig 1A below shows the block diagram of a basic SSB transmitter.

Modern transceivers, especially the ones that have a general coverage receiver, have a much more complex transmitter diagram than the one shown in fig 1A, but the basic principle is the same. The main differences are that more frequency conversions take place (ie more blocks of the type "BAL MOD or MIXER") and that the block marked "HF OSC" would be a complicated frequency synthesiser. In a simple transmitter for the 80 m band the block marked "HF OSC." could simply be a VFO (variable frequency oscillator). The frequencies shown on the diagram are for a transmitter tuned to transmit on Lower Side Band (LSB) at 3650 kHz as discussed below.

If you look at the block diagram of your own transceiver it may be difficult to identify the corresponding blocks because they may be labelled differently. For the purpose of this discussion there is no difference between the blocks I have labelled "BAL MOD" (balanced modulator) and "TX MIXER". They are both usually double balanced ring modulators made up of diodes and toroid core transformers to reduce the levels of the input signals appearing at the output. On your own block diagram you may find symbols rather than text for these blocks. Some symbols used for Mixers, Modulators and Balanced Modulators are shown in Fig 1B.

Let us now examine the various parts of this block diagram where a change in signal quality is likely to occur.

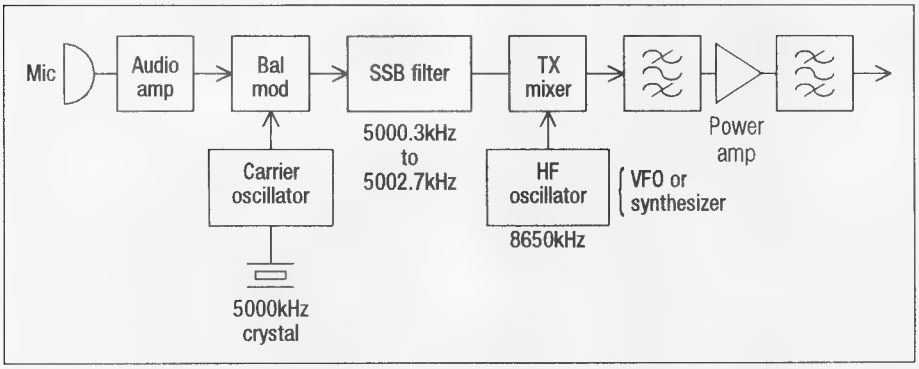

Figure 1A — Block Diagram.

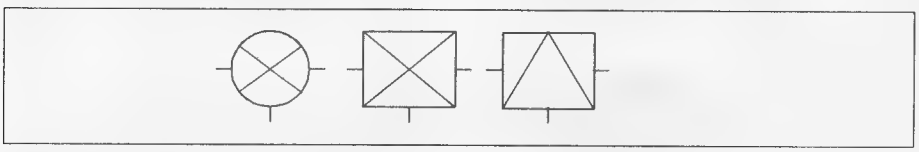

Figure 1B — Mixers or Modulators.

1. The Microphone

If the microphone is defective, say the coil of a dynamic microphone rubbing on the magnet, or an electret microphone operating without proper bias, then severe distortion can occur. In most cases, however, the microphone is far better than any other part of the whole system as far as audio quality is concerned, and should not be altered or replaced to remedy problems elsewhere.

2. The Audio Amplifier

The level of the audio signal through this amplifier is usually low so that negligible distortion will occur. However, the amplifier is often used to modify the frequency spectrum of the signal from the microphone. If the microphone has a flat response, this is necessary to enhance the part of the speech spectrum that contributes most to intelligibility. About 70% of the power in typical male speech is concentrated below 300 Hz. But this part of the speech spectrum contributes almost nothing to intelligibility. By shaping the frequency response of the audio amplifier these low frequencies can be reduced before they reach the modulator. More power will then be concentrated in the desirable higher portion of the speech spectrum. This becomes even more important if an audio speech clipper is used. If the low frequencies are allowed to reach the clipper severe intermodulation distortion (mixing) will occur.

3. Carrier Oscillator and HF Oscillators

In good commercial equipment these oscillators (or synthesisers) are clean and stable. However, in older equipment or home brew rigs these oscillators could become frequency modulated. This occurs when the Tx amplifier draws heavy current from a badly regulated power supply, causing the supply voltage to the oscillator to vary. The result can be dreadful.

4. Carrier Oscillator Adjustment

Improper adjustment of the carrier oscillator frequency is one of the most common reasons for reports of "bassy" audio. The microphone and audio amplifier frequency responses will usually only cause a moderate reduction of frequencies below 300

Hz. It is up to the SSB crystal filter to get rid of the rest. But this can only happen if the carrier oscillator frequency is correctly adjusted with respect to the edge of the crystal filter. Let us assume that the crystal filter has a frequency response as shown in fig 2, and that the carrier oscillator is adjusted to 5000 kHz. The audio signal into the modulator is mixed or "multiplied" with the carrier, and the result, coming out of the modulator, is the carrier (suppressed due to the modulator being balanced) plus and minus every frequency in the audio signal. We can see straight away that carrier minus audio will be less than 5000 kHz and will therefore not go through the filter. Carrier plus audio on the other hand will come through depending on the audio frequency. The table below shows how the various audio frequencies will fare.

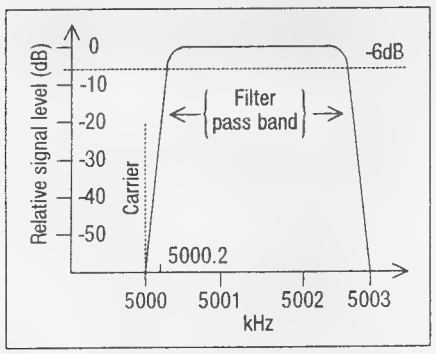

Figure 2 — Filter Response.

AUDIO Hz	AUDIO + CARRIER kHz	FILTER ATTENUATION dB
100	5000.1	40
200	5000.2	20
300	5000.3	6
500	5000.5	0
2400	5002.4	0
2700	5002.7	6
2900	5002.9	40

The situation shown in the table is typical for a well adjusted carrier oscillator (and an excellent crystal filter).

It takes very little change in the carrier oscillator frequency to have drastic effects on the audio. Look at Fig 2. If the carrier is shifted to 5000.2 kHz (+200 Hz), then the attenuation in the filter for a 100 Hz audio frequency would only be about 6 dB, and the signal would sound "bassy". If on the other hand the carrier was shifted down to 4999.8 kHz (±200 Hz), then we would have an attenuation of 20 dB for a 400 Hz audio frequency and an attentuation of 40 dB for a 300 Hz audio frequency and the signal would sound "thin". (Remember that you are moving the carrier and the sidebands back and forth along the horizontal axis where the filter curve is fixed). If you are a male with a deep voice and have been smoking 20 cigarettes a day for the past 60 years then the last example may be suitable for you. If on the other hand you are a YL with a voice like a canary, then the first example (5000.2 kHz) may be better. Most people will fit somewhere closer to the example in the table. Don't forget that the carrier oscillator frequency will affect the receiver in the same manner, and that it also will affect the calibration of the frequency display or scale.

5. Mixers/Balanced Modulators

These are designed to be non-linear devices and will therefore cause "modulation" or "mixing" of the carrier with the signal frequencies. In this case this is the desired effect. The carrier is at a high level and will drive the diodes (if diodes are being used) into non-linearity. With sufficient drive level the diodes act as switches. The signal (audio or RF) on the other hand, must be at a low level to avoid distortion. If the signal level is too high it will itself "drive" the mixer and cause mixing or intermodulation between the individual components or frequencies of the signal. The result is audible distortion in the received signal, and increased bandwidth of the signal coming out of the mixer.

6. Power Amplifiers

Overdriving of the final amplifier is a well known and well documented problem and will not be covered here. If you want to transmit a clean signal that sounds good at the other end, then keep the mic gain down. For a 100W rig the ammeter should only kick up around 4 A (12V supply). If this does not get you through, fix your antenna!

Remedies for old out of tune rigs or raspy voices

If you get reports of poor audio and you have tried another microphone, checked the power supply regulation, ensured that the cable from the PS is short and solid, then you may have to attack the audio amplifier or alter the tuning of the carrier oscillator. (The problem could be in the power amp as well, but that is another story).

Adjustments on your transceiver

If you think there is a need to adjust the carrier frequency of your transceiver and you decide to be brave and take the covers off and do it yourself, the first thing to do is to identify the carrier crystals for upper and lower sidebands on the block diagram in your handbook. Look for crystals with approximately the same frequencies as the SSB crystal filter. Then find the same crystals on a component layout diagram or photograph (as for IC735). If you are successful so far, it should be easy

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See Review in July '93 Amateur Radio

to find the crystals in the transceiver. Next to the crystals there will be trimmer capacitors for fine tuning of the respective crystal frequencies. But be careful; apart from USB and LSB the same crystals may be used for AM, FM and CW, with different trimmers being switched into action for each function by diodes. When you think you have identified the trimmer for LSB, say, note the exact position of the screwdriver slot, just in case you are wrong. Set the receiver to LSB and tune the receiver to a strong carrier, such as a crystal calibrator and obtain a tone of a few hundred Hz. Carefully turn the trimmer by a small amount. You should hear the tone change frequency. If it does not, you have adjusted the wrong trimmer and you must reset it to its original position. When you have found the right trimmer, tune in a strong SSB signal, preferably someone you know, and adjust the trimmer until the signal sounds good. You will have to retune the receiver each time you adjust the trimmer. The effect the trimmer setting will have on your transmitted signal will be the same as the effect it has on the signal you are listening to. Now check the frequency response of the receiver. Turn on the crystal calibrator of your set or tune in another strong carrier (S9). Watch the S-meter as you tune through the signal. The audio frequencies where the S-meter reading drops one or two S points below the maximum reading will be the upper and lower edges of your pass band. If your S-meter is good (few are!), it should show a change of one S point for every 6dB change in the signal, and you could plot the complete frequency range of the signal by comparing the audio tone to the tone from a calibrated audio oscillator, or by reading the digital display of your transceiver.

Tailoring the audio amplifier to your voice

If you have a deep raspy voice it could be necessary to alter the frequency response of the audio amplifier. As the various rigs have different designs, it is impossible to give a simple recipe. The example below shows a flat microphone driving an amplifier with a lower 3dB

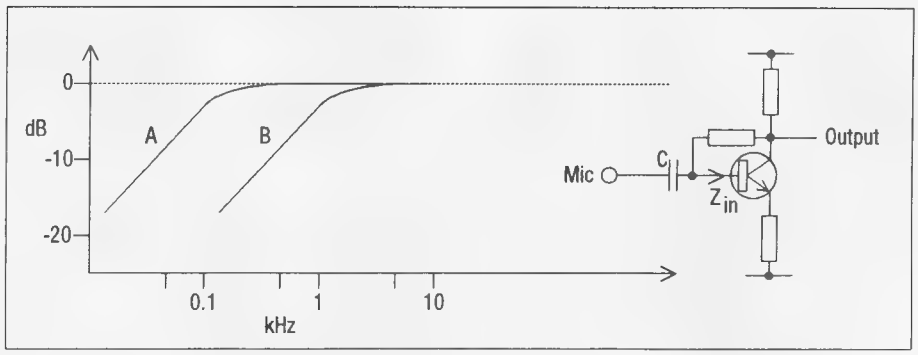

Figure 3 — Audio Response.

cutoff at 100 Hz (Fig 3, curve A). The input impedance is assumed to be 16 kohm. If we reduce the coupling capacitor C from 0.1 μF to 0.01 μF the frequency response will change as shown in curve B. You will probably find it difficult to establish a figure for the input impedance of the amplifier. Experimenting with values for C between 1/2 and 1/10 of the original value should bring results.

Happy experimenting!

PO Box 457, Armidale, NSW 2350

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WIA News

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of September 1993.

L10151 MR G M MCGOWAN
L20957 MR G NASH
L30866 MR W MCEVOY
L30867 MR R E FAY
L40088 MR H PEDERSEN
L40329 MR D V COLLINS
L40330 MR J E REAY
L50309 MR G C BRUECHER
L50311 MR L PEACOCK
L50313 MR A C SAUNDERS
L50316 MR W G GITSHAM
L50317 MRS M D S COLLINS
L60332 MR N E CHAPMAN
L60333 MR S FARRANT
VK1LEC MS L E CONDIE
VK3EBT MR B J TREASURE
VK3NF MR M MARTINI
VK3RN MR A H MAMESAH
VK4BUR MR P R BURR
VK4CQH MRS H A LEHTO
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VK4DDJ MRS J SIM
VK4JBS MR B F STEVENS
VK4TEV MR P J PICKERING
VK4TH MR T L HAMMOND
VK5LDA MR L D AUSTIN
VK5NDZ MR G J BRIDGLAND
VK5ZOB MR F R O'BRIEN
VK8NSB MR S L BIRKIN
VK8XDB MR D R BRAMICH

Changes for Taipei League

The Chinese Taipei Amateur Radio League (CTARL) of Taiwan now has a new President and management team who will run the organisation for the next two years.

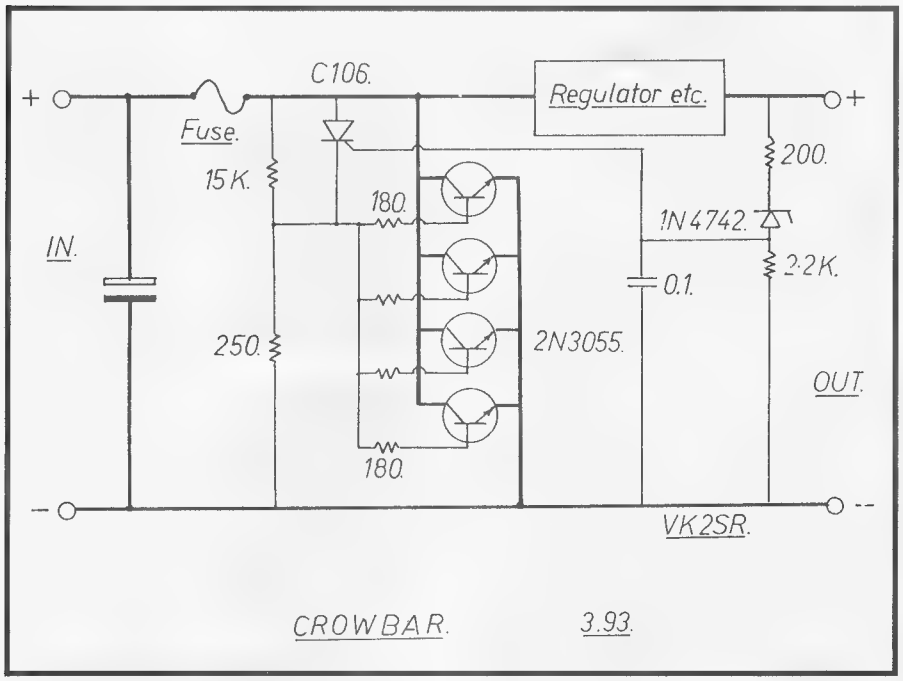
Bolon Lin BV5AF is the new President, taking over from Tim Chen BV2A who has retired. He was the founding President of the CTARL in 1991. The CTARL is a member of the IARU (Region 3).

Vice President and IARU Liaison Officer is Ralph Yang BV2FB, who was formerly the Secretary General. The new Secretary General is Anthony Li BV4OB. Deputy Secretary General is Bear Huang BV2WC.

The CTARL operates the Taiwan QSL Bureau, which is PO Box 93, Taipei, Taiwan ROC. The League is headquartered in Changhua. You can contact them by mail at PO Box 39, Changhua, Taiwan ROC.

An Effective Junk Box Crowbar

*Geoff Switzer VK2SR * puts his junk to practical use.*



This circuit is intended for the interest of those who have a junk box stock of rugged transistors and who want to avoid the cost of an expensive Silicon Controlled Rectifier (SCR).

The values shown are those used in several of my own "marks" of the idea. However, a few comments regarding the circuit operation are in order. The principle is to fire a light duty SCR which, in turn, turns on hard as many suitable transistors as may be necessary to reliably and quickly blow the fuse.

I settled on a current of 3 amps per 2N3055. One particular crowbar has eight in circuit. No heat sink is necessary as the conduction time is very short, only as long as it takes to blow the fuse.

The sensing circuit is conventional. The 200 ohm resistor could be a preset of, say, 500 ohm. The values shown sense an over-voltage of 14.5 volts.

The 180 ohm base resistors are desirable and are common junk box values. Some care should be taken in selecting the 15 kohm and 250 ohm resistors across the incoming supply. These values provide a standing bias to the 2N3055s which should only draw a few milliamps for the group and should therefore stay cool.

When fired, the C106 effectively short circuits the 15 kohm resistor and the whole input voltage, say 25 volts, is applied to the bases. At the same time the 250 ohm resistor is placed directly across the supply and will carry 100 mA until the fuse blows. This is only for a few milliseconds but the power dissipated for this time is 2.5 watts.

The 0.1μf capacitor on the C106 gate prevents any false spikes. A smaller value will reduce the time constant.

The whole idea is presented as a basis for experiment. It could become a valuable outboard attachment to such commercial power supplies which do not include over-voltage protection.

* *53 Turf Street, Grafton NSW 2460*

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WIA News

New amateur radio society for the Russian Federation

The disintegration of the USSR saw the collapse of the former country's amateur radio society, the RSF. There is now a new national amateur radio organisation registered in the Russian Federation, known as (in English) the "union of radio amateurs of Russia", otherwise called the SRR. It was registered last April with the Russian Ministry of Justice as the country's national amateur radio organisation.

The SRR is seeking membership of the International Amateur Radio Union (IARU).

The new society publishes a bi-monthly magazine and runs a QSL bureau for Russian Federation amateur operators.

The inwards and outwards QSL bureau address is **PO Box 59, Moscow 105122, Russia.** This is also the mail address for the SRR.

This bureau will also serve for amateurs in some CIS countries, although the SRR does not say which as this is currently the subject of negotiation.

The SRR advises that the safest way to QSL with Russian Federation amateurs is via the above address.

If you're going to the Russian Federation and are interested in operating while you're there, you should apply to the SRR at the above address. They have an agreement with the Telecommunications Authorities which enables them to provide this service.

We are unsure where this leaves the Krenkel Radio Club, which earlier this year advised they had taken over from the previous Radio Sport Federation and was running Box 88, Moscow and arranging contests, exhibitions and DXpeditions (see August *WIANews*).

Repeater Reverse Switching for the Dick Smith Explorer

*Here is an interesting modification for the Dick Smith Explorer designed by A Crewther VK3SM * and I Simpson VK3XIS **.*

The Explorer has no capability to check the input of repeaters on 430 MHz. It can easily be added using only a few parts and the same circuit as the original offset oscillator.

A small spring return non locking switch mounted over the S meter does the switching of the 10V Rx line just as the repeater switch does for the transmitting crystal.

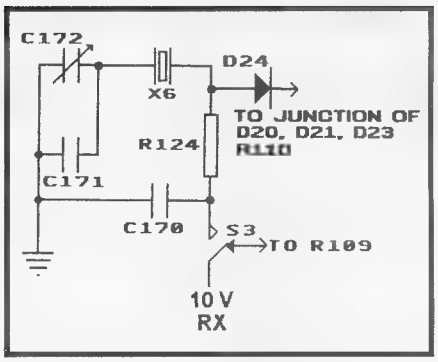
The method of obtaining the operating frequencies for the transceiver is described on page 15 of the manual. The operating frequencies are produced by the combination of three separate oscillators. Of these only one can be altered and this already has three crystals fitted. These crystals are :- receive, simplex transmit, and repeater transmit.

As the repeater receiver operates 5 MHz below the transmit frequency we have to reduce the receiver frequency on our unit to hear the input of the repeater.

The transmit oscillator crystal for repeater operation is 0.4556 MHz lower than the simplex transmit crystal. This means that the receive crystal for repeater input must also be reduced by the same amount. The new crystal needs to be 46.11661 MHz.

The crystal was supplied by a local crystal supplier. A copy of the oscillator circuit was sent to the supplier in order to assist in getting the crystal on the right frequency.

The few parts were mounted on a scrap of matrix board supported by a couple of stiff wires. The wires were anchored to the PCB through a couple of holes drilled near the connection point.



When the soldering is finished the oscillator frequency can be checked with a counter at the junction of C57 and R53. Grid Square F9 on Main Board. Alternatively a receiver tuning below 144MHz can be used. For channel 28 on the lower band, if the 80 channel modification has been made, the frequency is 140.866 MHz.

Parts List

C170	.01 μF ceramic
C171	10 pF NPO
C172	20 pF Trimmer
D24	1N914
R124	2.2 K 1/4W
S3	C/O NL DS Cat P7578
X6	46.11661 MHz

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SOME THINGS HAVE NO COMPARISON

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Technical Abstracts

Gil Sones VK3AUI

Iron On PCB Resist

Photocopier Toner can be used as resist when making Printed Circuit Boards. The main problem is to get the pattern transferred onto the PCB laminate. John Grebenkemper KI6WX in QST for July 1993 presents a step by step approach to producing etching resist patterns using a photocopier. The toner pattern produced by the photocopier is transferred to the laminate using a household iron.

The pattern cannot be directly deposited on the laminate by the photocopier but can be transferred using a household iron as a heat source. Experimenters would be well advised to obtain their own iron to conduct experiments. Other users of an iron may not be sympathetic to your experiments.

First you must obtain a mirror image of the pattern. Use some transparent film in the photocopier such as is used for transparencies. Then simply turn it over and print the mirror image onto plain paper in the photocopier. Use a plain backing sheet behind the transparency to obtain the component side view in this step.

Now thoroughly clean the PCB laminate. This must be really clean if the Toner is to stick to it.

The component side photocopy is now placed with the image against the clean PCB laminate copper side and held in place. The iron is then used to iron the back of the paper. The iron is set to the cotton or linen position of about 300°F or 150°C. Clean sheets of paper between the ironing board and the laminate, as well as the photocopy sheet and the iron, are advisable in case of inadvertent transfers. The ironing action should be smooth and in a circular motion.

The toner should start to stick to the copper of the PCB laminate. Be careful to uniformly heat the whole area so as to get a complete transfer. Be careful as the whole sandwich will be very hot.

Let it cool down and then place the laminate with adhering pattern and paper in a solution of bleach for several hours. Overnight would be about right. The bleach solution is made up with a cup of bleach to 4.5 L of water. The bleach can be bought at a supermarket and either the house brand or "White King" should be suitable. The active ingredient is sodium hypochlorite. This step should be carried out in a well ventilated area as the bleach has a pretty strong chlorine smell.

The toner pattern produced by the photocopier is transferred to the laminate using a household iron.

After a period in the bleach the paper will be somewhat softened. You can then gently scrub away the soggy paper with a soft brush. Be careful not to damage the pattern adhering to the copper surface.

Any scratches or blemishes can be touched up with a resist pen. The board is then etched in the usual way in Ferric Chloride. The etched board is then cleaned up using steel wool to remove the toner.

The QST article shows some pretty fine examples of the technique including a multiplier to 10 GHz on a Teflon laminate. It may pay to use a less critical layout and less exotic material for your first attempts. Good luck and good etching.

160 Metre AM Transmitter Update

In Technical Abstracts, Amateur Radio, Aug 1993 the circuit of a 160 metre AM transmitter was given. Unfortunately, the source circuit needs correction. In Rad Com August 1993 the following correction was given.

"The inverting input to the microphone amplifier (IC1a pin 2) should be directly connected to the slider of RV1. Back to back diodes D1 and D2 are then connected between pins 1 and 2 of IC1a."

ZL LF Tests

Break In, August 1993 carries news of LF tests being carried out in New Zealand on 181 kHz. The tests are conducted on Thursday evenings from 0900 to 1000 hrs UTC and reports are welcome even if the report is negative. The ZLs look for VKs on 3690 LSB or 3689 CW at 20 minutes past the hour with Kevin ZL4MD as the contact station.

There are a number of ZL stations active on LF and reception should be possible. Many radios will cover this frequency but a loop and loop preamp may help. Look back through Amateur Radio magazine for articles by VK3ACA and VK5BR for

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information regarding propagation and equipment for these frequencies.

Long Distance Tx Hunt

For all those who think they have been on a long distance transmitter hunt the Southern California All Day Hunt has set a new standard. This hunt which takes all day and can extend for 24 hrs had a previous record distance of 252 miles or 406 km approx. There are a number of transmitters to find along the way but the main transmitter must be receivable at the start and within the continental USA.

The new record is 344 miles which is three states away in Utah from the start in Los Angeles. The hunters had to resist the pokies in Las Vegas on their way to find the transmitter. The metric distance is approx 554 km.

The transmitter started off with 600 watts output into a 15 element beam. Quite a fox transmitter but then it had to be receivable for quite a long haul. The winner was N6MI who covered 460 miles to find all the 4 transmitters in the hunt. The last transmitter was found after midnight in a snowstorm.

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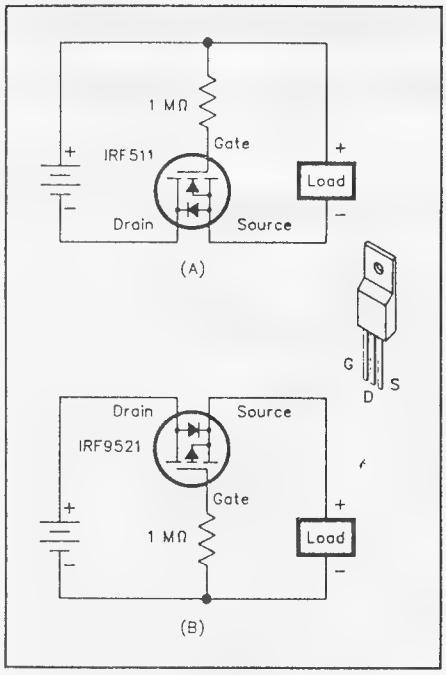

Fig 1 MOSFET Polarity Protection Circuit.

The transmitter was hidden by N6YKE and AF6O. Six teams took part and four found all the transmitters. The hunt took place on Feb 27 1993.

The story of the hunt is in 73 Amateur Radio Today, June 1993 issue.

Reverse Polarity Protection

Some useful circuits for reverse polarity protection appeared in QST July 1993 in an article by Michael A Covington N4TMI. The chances of reverse polarity are fairly high, particularly with the use of plug packs and the coaxial style power plugs used. The polarity of these varies between makers and can present a hazard for your gear.

The traditional approach has been to use a diode either in series or parallel. The series diode provides a voltage drop which may be unwelcome. A parallel diode bypasses the reverse polarity and hopefully pops the fuse before it melts as well as the fuse.

A power MOSFET can be used as a switch. It must be connected the other way around to what you would expect as it also contains a parasitic diode between drain and source. The FET is, however, bidirectional and will work in this fashion. An N channel

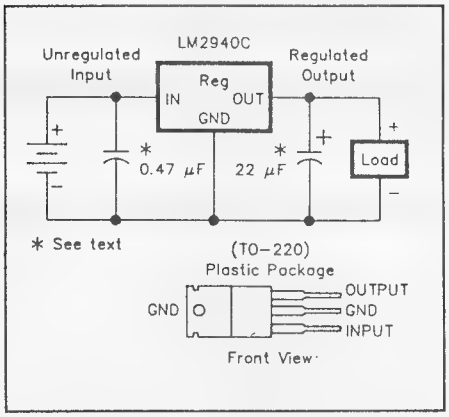

Fig 2 LM2940 Low Voltage Dropout Regulator with inbuilt reverse polarity protection.

FET must be put in the Negative Line and if you want to switch the Positive Line then you will need a P channel FET. The circuit is shown in Fig 1.

Whilst not as common as 2N3055s there are quite a lot of Power MOSFET's around at reasonable prices. They have the advantage of a very low ON resistance which leads to a very low voltage drop.

For situations where you are using a voltage regulator and polarity reversal is a possibility, then the LM2940 series and LM2941 have built in reverse polarity protection. The other advantage of these regulators is their low drop-out voltage of around 0.5 Volts. See Fig 2 for the circuit. The capacitors at input and output must have low series resistance and must be close to the regulator IC.

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Help stamp out stolen equipment. Keep a record of all your equipment serial numbers in a safe place.

The Rooftop Run

Bob Tait VK3UI explains why only fit operators meet this WICEN challenge.

History of the Bogong to Hotham Event

In the days when technology didn't count for very much, a lone skier, Charles Derrick, attempted a marathon ski trek from Mountain Creek to Mount Hotham. An arduous journey at the best of times. An impossible one in a blizzard.

In September 1965, Charles Derrick set out in a late winter burst of foul weather using equipment that lacks the sophistication of modern day technology. His endurance and tenacity were supreme as he kept skiing through horrendous gales, fighting fatigue.

Graeme Wheeler in his book "Walk in the Timeless Land" poignantly writes, *"He had pushed almost 30 miles of terrain beneath his skis, had gained and dropped over 9000 feet. Within a mile of his objective the weather had pounded him to a halt, frozen, exhausted".* A cairn now marks the spot close to Mount Hotham where Charles Derrick perished.

The Footrace

The first footrace was held in 1984 over the same course Charles Derrick attempted but during summer, not winter. Traditionally it has been held in late December or early January. Even so, the weather can be foul, as it has on a few occasions; it can also be extremely hot and heat exhaustion can be a worry.

Russell Bulman, orienteer and organiser, and founder of the Rooftop runners (a group of runners who like running mountain trails) devised the footrace to follow Charles Derrick's original course. The challenge of the tough course soon drew quite reasonable numbers of competitors. The Australian Ultra Runners Association Inc (AURA) has now taken over the running of this the hardest and most difficult footrace in Australia.

The record for this 60 km course stands at 6 hours 58 minutes and 52 seconds.

The Course

The course has an overall climb of 3000 metres and an overall descent of about 2000 metres. In a total distance of approximately 60 km, this equates to the toughest trail run in Australia. The start is particularly tough in that after an initial 2 km of undulating 4 wheel drive track, the trail climbs 1300 metres in the next 6 km to the summit of Mt Bogong. After losing a lot of body fluid through perspiration on the way up, the steep descent into Big River and T- spur wrecks the runners' legs. The relatively easier second half of the race becomes tortuous as they then push their sore and tired bodies across the high plains, down into Cobungra Gap, Dibbin's Hut, Derrick Hut past Mt Loch and on to Mt Hotham. The weather can even be unkind to them in the last stages of this event as the cloud can close in and obscure the finish; which can result in runners becoming disoriented and lost, only metres from the line. Once they cross the finish, dedicated teams of helpers swoop on the weary and fill them with warm soup and provide warm dry clothing. The helpers then whisk them off the mountain to relax in more hospitable surroundings to discuss the events of the day, or perhaps to say "never again", until next year!

A pretty tough event for those wishing to sharpen their field skills as WICEN operators.

Remember to leave a three second break between overs when using a repeater.

WICEN

Having given you an overview of this event, it is also likely that it may also be a pretty tough event for those wishing to sharpen their field skills as WICEN operators. This event is the only activity that I'm aware of that has the ability to test not only the resources of operators, but their fitness as well. There are 13 checkpoints. Of these only 5 can be reached by road; the other 8 must be reached by walking from 2 hours for the shortest (pole 333) to 3.5 hours to Roper's Hut. All the equipment required must be carried into the site, such as a fold up Yagi for 2 metres, a handheld, spare batteries for 2 days operation, a map of the High Plains area; along with all the necessary equipment for an overnight stay in the area. You need warm clothes, as it can get very cold at night.

The check points are as follows: Mountain Creek, Bivouac Hut, Mt Bogong Summit, Cleve Cole Hut, Maddison's Hut, Roper's Hut; Watchbed Creek, Cope Hut, Pole 333, Dibbin's Hut, Derrick Hut, Mt Loch car park, Mt Hotham. The area map is called "Bogong 8324" and is available from VICMAP.

Check point teams usually comprise a radio operator, a first aid person and a representative of AURA. In the past these teams have been found to work very well together. If you like bushwalking, photography, amateur radio and spectacular views, this is the place for you. Have you activated the Alpine National Park? If not, how about coming along on the 2nd January 1994?

If you are really interested in trying something different how about getting in contact with Phil Longworth VK3XQP (060) 58 7711, Bob Tait VK3UI (03) 785 1739 or Alan Burgess VK3QL (03) 754 7943 about this challenging event. We also hope to have electronic media and print media coverage for this year's event.

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Meteor Burst — An Introduction

Ross Dannecker VK4ZFD presents an interesting facet of our hobby*

Billions of tiny meteors entering the earth's atmosphere each day give rise to ionised trails capable of "reflecting" radio signals. These trails occur at a height in the order of 100 km and last, on average, for a few tenths of a second.

Although billions of meteors enter the earth's atmosphere daily, only those few entering at the right place with the right orientation will support communications between two specific locations. The signal "reflected" back to earth occupies a footprint typically 5 km wide by 25 km long.

The arrival rate of meteors in the atmosphere varies somewhat. Over a one-day period, it is at a maximum around sunrise, and at a minimum around sunset. Over a year, it is at a maximum in summer and a minimum in winter. Meteor showers also occur at certain predictable times of the year. Omitting the showers, the variation in arrival rate between sunrise in summer and sunset in winter is in the order of 10:1.

The received level from a meteor trail reflection is a function of the power transmitted, the free space propagation loss over the path and the loss incurred in the re-radiation by the ionised plasma of the trail. The received level is also inversely proportional to the cube of frequency. Therefore, for best performance, the lowest available frequency should generally be used. For regulatory and other reasons, meteor burst systems seldom operate below 30 MHz. Most commercial and military systems throughout the world operate in the 40-60 MHz region.

Typical modulation rates of the transmitted data range from 2000 to 9600 b/s. Consider a system operating at 4000 b/s. Over a one-hour period there may be 30 useable meteor bursts averaging 30 ms each. The average data throughput would therefore be (4000 × 30 × 0.3)/3600 = 10 b/s or about two typed A4 pages per hour.

Meteor burst systems operate in several possible modes:

(1) Full Duplex — simultaneous TX and RX on two separate frequencies (highest throughput).
(2) Half Duplex — alternate TX and RX on two separate frequencies (simplest hardware).
(3) Simplex — alternate TX and RX on the same frequency.

More packets will then be sent until the meteor burst ends or the message is completed.

A central control station will send out a general poll to its remote stations. These usually operate in the half-duplex mode. When a remote station successfully receives the poll signal at the beginning of a meteor burst, it switches to the transmit mode, sends its address and a packet of data back to the central station and then listens for an acknowledged signal from the central station. More packets will then be sent until the meteor burst ends or the message is completed. Data exchange protocols include a lot of error checking and correction.

Useable meteor trail reflections occur over a wide amount of sky. For a 1000 km path, most of the reflections are from trails located about 100 km on either side of the great circle path connecting the two sites. This influences the choice of antenna systems used for meteor burst. While high-gain narrow-beamwidth directive arrays will increase the system gain, for path lengths less than 500 km the beam may be so narrow as to miss illuminating the so-called "hot spots" on either side of the direct path. Also, for short distances, trails above and behind the central station can be useful. To improve short-distance communications, a Yagi may be tilted up or a less directive antenna system used. Ground reflection effects can also be used to advantage. Polarisation used is usually horizontal for noise reasons.

Because of the low received power levels of a meteor burst system, the radio noise environment is critical. Noise can be galactic, man-made or receiver.

(a) Galactic noise can be calculated from available formulae. At a frequency of 54 MHz and an RF bandwidth of 10 kHz, the galactic noise level is -122.5 dBm.
(b) A receiver noise factor of 5 dB would be typical at this frequency. This would result in an equivalent input noise power of -128 dBm for the receiver.
(c) Man-made noise varies considerably with location and time. CCIR report 258-4 gives typical average values of -109.5 dBm for a residential location, and -114.8 dBm for a rural location for this example. These results may be exceeded for 10 per cent of the time by 12 dB and 5 dB respectively, giving design levels of -97d dBm and -109.5 dBm for the residential and rural situation for good system availability.

Consider now the received levels to be expected for a system with the following parameters:,
Transmit power 100 watts (+50 dBm)
Range = 1000 km (Brisbane to Canberra)
TX antenna = RX antenna = 5-element yagi (12 dBi gain)
Frequency = 54 MHz
Feeder losses <1 dB.

The free space path loss is 127.3 dB. If the meteor trail "reflection" were lossless, then the received level would be 50+12+12−127.3 = −53.3 dBm. However, the meteor trail "reflection" introduces a significant loss which lies in the range of 35-60 dB, depending on the orientation and degree of ionisation. The mean value would be 53 dB, and subtracting this from the free space received level calculated above gives a meteor burst average received level of −106 dBm.

Meteor burst communication systems typically use binary phase

shift keyed modulation for the data. For a maximum manageable bit error rate in the raw data of 1 in 1000, such a BPSK system requires a signal-to-noise ratio of 8 dB. Therefore, the received noise level of the system under consideration must be less than −106-8 = −114 dBm to work for an average ionised trail.

Recalling that for the residential situation the noise level was −109.5 dBm average with −97 dBm for 10 per cent of the time, one can conclude the meteor burst system under consideration will not work except for a small number of highly ionised trails. For the rural situation, the expected noise levels were −114 dBm average with −109 dBm for 10 per cent of the time. One can therefore conclude that the average ionised trail will produce a workable result for most of the time. If a very quiet rural site is available, a noise level of −116 dBm or better could be expected. The system under consideration would then work for a high percentage of the time.

The above example shows just how marginal meteor burst communication systems are. Everything has to be optimised, especially local received noise level.

If you are interested in hearing some meteor burst propagation, consider listening for TV Channel 0 transmissions. (If you are at least 300 km distant from a high power transmitter, of course). The audio carrier frequency is 51.75 MHz, while the video carrier is 46.25 MHz, and there are two high power transmitter locations in Australia. You will need a wide-band FM receiver for the audio, but a narrow-band AM receiver is OK for the video. Because of the brief nature of the bursts, some receiver mutes may not open in time, so leave the receiver unmuted, if you can stand the noise. Sunrise in summer is the best time to listen. The distance limit is about 2000 km for meteor burst.

For the intrepid amateur experimenters, please note that the practical working range using Yagi antennas is roughly from 300-1000 km (ie, there is a "skip distance" effect). Note also the fact that the performance decreases with the cube of frequency; so results using the two-metre band will be 20 times worse than can be obtained using the six-metre band, given the same technical parameters. In fact, the six-metre band is well suited to meteor burst communications.

For further reading — Meteor Burst Communications by Jacob Z Schanker, Artech House Inc, ISBN 0-89006-444-X.

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WIA News

Historic UK-VK contact celebrated

The first radio contact between the United Kingdom and Australia took place on the 22nd of September, 1918 when Guglielmo Marconi sent a message which was received by Ernest (later, Sir) Fisk at his home in Wahroonga on Sydney's upper north shore, which still stands.

A monument commemorating the event stands outside the house.

The Dragon Amateur Radio Club of North Wales wrote to the WIA with a plea for information on who was involved, which we published in August *WIANews*.

Jo Harris VK2KAA of the newly-formed Wahroonga Amateur Historical Radio Association (WAHRA) contacted the Dragon club and organised a celebratory two-way contact to coincide with an event to commemorate the historic occasion.

WAHRA obtained a special callsign, VK2WAH, for the re-enactment, which included 400 local school children.

Successful contact was made between VK2WAH at Wahroonga and GB2VK, operated by the Dragon club at Gwynedd (pronounced "Gwynneth") in Wales at 0708 UTC on 22 September.

Apart from the school children, the gathering at Wahroonga included local residents, historians and local amateurs. Distinguished guests included Dr Graham Fisk — Sir Ernest Fisk's son — John Dougall managing director of AWA, Pierce Healy VK2APQ, and the Mayor of Kuring-Gai, all of whom addressed the gathering. Dr Fisk was accompanied by ten other members of the Fisk family.

John Howard VK2AMH played a tape of the original Morse message to the school children.

One interested visitor to the gathering learned of the event while reading the *Sydney Morning Herald's* front page "Column 8" on the train that morning. He left the train and returned to Wahroonga. It was Robert Maclurcan, the son of one of Australia's radio pioneers, Charles Maclurcan who is honoured in the 1922-registered Constitution of the NSW Division.

At the Welsh end, a BBC recording crew attended along with the local Member of Parliament. The Welsh amateurs were delighted when the MP promised that a monument would be erected at the site of the first transmission.

WAHRA gained some valuable local publicity for the occasion. A lengthy article on the event and amateur radio involvement appeared in the *Sydney Morning Herald* the Saturday before the event, accompanied by a photograph showing the Fisk monument. Apart from the SMH Column 8 story on the day, the following week there was a story and picture in the local paper, showing Jo Harris VK2KAA with the equipment.

VK2WAH operated for 24 hours only. While band conditions were very poor and few contacts were made, the station managed to work most continents. A special QSL card will be issued for contacts made during the event.

It is hoped that a tradition will start for a Wahroonga to Wales contact to be made every year on 22 September.

(Thanks to Jo Harris VK2KAA for supplying information used in this item).

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(see the WIA Division Directory on page 3 for the address of your Division)

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Pioneer Trek By Horse

*J P Mahoney VK4JON **

Four hundred kilometres on horseback is a long way to ride, even if you do it over 5 days. With a veterinary checkup twice a day, you need to have your horse in peak condition to continue in the event. And what about the safety aspects of the ride? How do you get help if something happens? It might be just a lost shoe. That could make your horse lame on the stony bits.

Well, one solution to the problem of safety might be to enlist the aid of your local Amateur Radio Club. That's just what the Far North Endurance Riders Association did. Based, roughly, on the Atherton Tablelands, the Association holds eight events each year, with the Pioneer Trek the largest. Over the last two years it has been held during the June school holidays, making it a bit difficult to enlist sufficient operators to do the job. A change has been mooted for next year.

Bob VK4ZZB and Stan VK4ZRO, being the only operators with "conventional" vehicles, were assigned to help me man the base station. Brian VK4BGS had a 4WD, but his health prevented him "going bush". His operating skills at the base kept us all on our toes for the three days he was with us, and his acid wit kept us sharp. Ted VK4YG brought along his trusty VW Kombi, not exactly a conventional vehicle when you consider the places he turned up for duty. Ron VK4ACZ turned up out of the blue on Monday night, ready for the 5 am start on Tuesday morning. I had changed my phone number in the recent weeks, and Ron missed out on the advice.

Lack of activity on the Tablelands repeater, VK4RTA didn't wise him up to the fact that his HT was on the blink, but a loaned set soon had him on air again. Stan VK4MFA found he had 4WDriving skills he didn't know he possessed when I sent him "over the hill" to one spot. It's amazing how 2 metres gets out of some of these places.

Here was Stan VK4MFA (we had two Stans and two Johns) way down in a very steep ravine, in stony, sandy desert type of country, having no trouble accessing the repeater which was sited in rain forest on the top of a ridge a good 20 km away. That road was so steep he had to use low range 4WD and he swore he would not cross it twice. Adolf VK4DHF had his first taste of Endurance Ride operation, but he soon got the hang of it.

We had a first hand example of what not to do when one of the riders got into difficulties, and needed help. As with most situations of this sort, the first rule is "Stay put, when you send for help". This chap didn't, and as a result the rescue vehicle went looking for him, and we thought it had got lost, too. The rescue vehicle didn't have an amateur operator on board, and for a while things looked grim.

When the rescue vehicle got as far as it could go, and still couldn't locate the rider, the driver set out on foot to look for him. It was nearly panic stations, I can tell you, because my wife was also in the vehicle. It all turned out OK, though.

The weather did nothing to help. Back at camp, it was alternately raining, or blowing a gale, or both. Over on the other side, a ridge or two away, the mercury was in the high twenties, with bright sunshine all around. Up around the repeater site, Longlands Gap, dense clouds hid everything from view. Height above sea level was about 1000 metres, give or take a hundred metres or so, and was not the warmest in June.

Wilf VK4ZNZ spent his first night on that outing in a little pup tent. XYL Helen soon put a stop to that caper. They went home next day for the pop top. John VK4VKL, being a hardy soul, was firmly ensconced in his swag for the duration, but within warming distance of a good fire.

I had spent some time on reconnaissance during the weeks leading up to the Ride, so was able to divide my time between base operation and mobile work. It was a case of doubling up where needed, as we did not have enough operators some of the time.

The operating side of things made for some interesting observations. Apart from Stan VK4MFA's experience with the ravine, even with 10 watts, in some places operators had to move their vehicles away from the checkpoint to contact the repeater. Yet the checkpoints were placed on the basis that contact with the repeater was possible from that particular point. In some instances the move was of the order of 5 or 10 metres, but in one case a move of 10 centimetres meant the difference between getting the message back, or not.

The tracks were many and varied. On one leg the riders found themselves in what was, to all practical purposes, desert country, only to have the scenery change in less than 10 kilometres into lush rainforest. Certainly enough diversity to keep one interested.

When the time came to do a "Bang-tail Muster", we had 10 operators, but such were their commitments elsewhere, every time we looked around, we seemed to be one shy, so leap-frogging of checkpoints became the order of the day.

Funny people, these Endurance Riders. The Salt of the Earth. They are preserving, as a sport, what to our fathers was a way of life. *"Struth, I can remember riding a horse 40 miles to a dance in the bush. We'd leave the station after lunch on Saturday, and get home Sunday afternoon. Dance all night, too. That was only 40 years ago.*

Remember the saying, "You don't have to be mad, etc.... but it helps?" I'm going to alter that. You do have to be mad! To do what, you ask? Well, certainly you have to be a bit mad to be an Endurance Rider, and maybe, too, to be in Amateur Radio.

**PO Box 194, Innisfail, Qld 4860*

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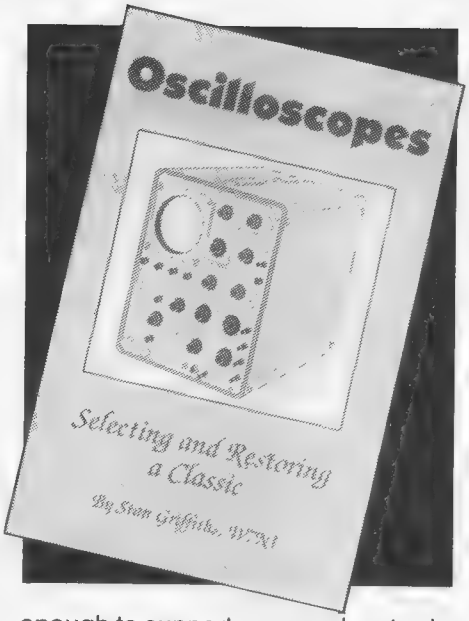
Book Review
Oscilloscopes
Selecting and Restoring a Classic

By Stan Griffiths W7NI
Reviewed by Evan Jarman VK3ANI



This book is intended to help the buyer of a classic Tektronix oscilloscope get the best buy for his money and make the most of his investment. So states the author when outlining the use of this book. This is certainly not a book on the theory and operations of an oscilloscope. It has been written as a buyer's guide for those in love with old Tektronix oscilloscopes.

The price of modern test equipment usually puts the amateur in the second hand or surplus market. This is a market where *caveat emptor* is a bylaw of life. The selection of good, or potentially good, equipment from surplus sources is a risky business. This book describes oscilloscopes built in the 50's, 60's and 70's when the founder of the Tektronix company was still influencing the designs. It describes separately each oscilloscope, plug in unit (time base, amplifier, etc) and even a couple of sampling heads. The descriptions are basic but also include a picture, any warning caution or special consideration, a recommendation and prices (US$), as well as current market value. This last item shows how real depreciation is in test equipment. The current market value was approximately 5% of the last listed catalogue price. When allowing for the deflated buying power of money it is easy to see that you would not buy these as an investment.

The author is to be commended for his recommendations. Quite often he suggests against purchasing a particular unit "unless you are into antiques". For someone who clearly loves the brand it is refreshing to see his objective appraisal. Special equipment such as vectorscopes include a paragraph outlining the purpose of the item suggesting that it would not be of much use for anything else.

The book also offers a variety of tips for restoring this equipment, ranging from cleaning methods to restoring appearance, to electrical modifications to restore performance. Information that is applicable to any surplus equipment. Some replacement part number information is also included but this is unique to Tektronix equipment. The book also includes the brand names of some "counterfeit" instruments which the author describes as "vastly inferior"; remember *caveat emptor.*

The book is clearly aimed at the American market which is large enough to support a secondary trade in brand test equipment. Europe could also be large enough but Australia would not. This is a specialised book to support a niche trade. It is doubtful that this book would be generally available in Australia. This is not to say that there would not be an individual interested, in which case they should contact the author who is also the publisher.

The review copy came from the author.

Paperback 140 by 237 mm.
372 pages

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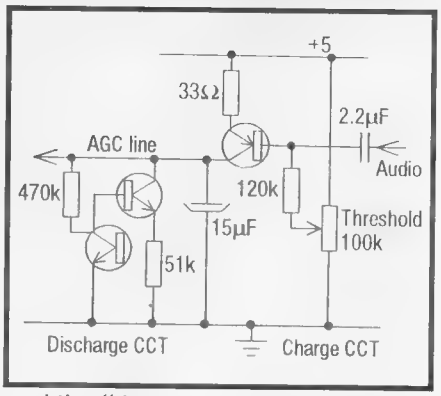
A Different Type of AGC Circuit

*Jon Lindstad, VK2WF * provides some comments on AGC*

Most receiver AGC systems use a resistor to discharge the agc holding capacitor. The "decay time" is determined by the time constant of the R-C combination. One problem with this arrangement is that, due to the exponential discharge rate, the AGC voltage will drop rather quickly to start with, and then more slowly. Ideally it should be the opposite, with the AGC voltage dropping slowly to start with, and then faster. The circuit described below, which I have been using in a homebrew rig, is an improvement on most existing systems as it uses a "constant current sink" to provide a constant rate of discharge.

The "attack" or charge rate is determined by the 33 ohm resistor,



and the "decay" or discharge rate by the 51 kohm resistor. These values may be varied to suit your application. Any suitable, garden variety transistors will do the job.

* PO Box 457, Armidale NSW 2350

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Teaching Transformers Long Ago

John Allan VK5UL mixes nostalgia with a small dose of theory*

For many years following WW II I conducted theory classes for would-be amateur and professional radio operators. As a result I had the opportunity to observe the major stumbling blocks encountered by students.

Many students had difficulty in understanding the subtle difference between resistance and reactance in an AC circuit, the characteristic impedance of a transmission line and last, but not least, the "impedance ratio" of a transformer. It was this last feature which they had the greatest difficulty in comprehending.

They had no trouble memorising the formula — Z ratio = turns ratio^2 (or voltage ratio^2). A contributing factor to the problem was due to the fact that the technical literature available to the average novice operator was limited in its definition.

The problem arises as a result of examiners, having stated certain parameters in the secondary circuit of a transformer, then setting the question: "What is the primary impedance?", when the question should read "What is the impedance reflected across the primary winding?". I could be accused of splitting hairs but once a student understands this interesting characteristic of a transformer he no longer worries how an open circuit primary can have a measurable impedance.

The above brings me to the prime reason for writing this article. That is to draw the attention of students to the fact that the impedance ratio of the transformer is also the reactance ratio. What follows is an attempt to present an interesting application of this phenomenon which is rarely, if ever, used today, but which was once used extensively in the valve era — the vibrator power supply.

It was during the late 20's that I took the first hesitant steps towards climbing the bottom rung of the radio ladder. It was also about this time that the first American-made car radios were becoming available locally. It was during this period that I first encountered the vibrator power supply. This device converted the 6 volts available at the car battery to 180 volts DC for the valve anodes/plates.

The mechanical vibrator chopped the DC into a spiky square wave AC.

This was an exciting period for a teenager. The 4 pin valves gave way to 5 pin then, in quick succession, to 6 pin, small 7 pin, large 7 pin and 8 pin; electrolytic (liquid) capacitors appeared, the superhet receiver arrived; the crystal filter; crystal controlled transmitters; a variety of exotic transmitting aerials; knowledge of sunspots and HF propagation was beginning to filter through to the layman; and Litz wire and Sirufer iron dust cores became available. (I could not believe the reading on our Boonton "Q" meter when I first tested a combination of 9/41 Litz and a Sirufer pot core). This with one night "wireless" theory and one night practical classes per week left little time for mischief. Well — some mischief — a little pirating on 5 metres.

I first attempted to service a car radio circa 1930. I was intrigued by the vibrator power supply and, in particular, a 0.008 μF mica dielectric capacitor (1000 volt rating) mounted across the secondary of the transformer. Even after tracing a circuit diagram I still had no idea how it functioned. For some time I pestered the "Old Timers" for clues and eventually was able to piece the picture together.

The mechanical vibrator chopped the DC into a spiky square wave AC. To keep the load on the vibrator to a minimum it was essential that the primary circuit had the correct frequency of oscillation. In effect it was desirable that the vibrator coupled into a non-reactive or resonant load. Now the primary winding had very few turns, hence the inductance was no more than a few μH. The vibrator was designed to have a frequency of 100 Hz therefore the primary X_1 was quite small but of sufficient magnitude to cause some "ringing" after the vibrator contacts opened. As only a small degree of X_c would be required to resonate with the primary X_1 at 100 Hz, the associated capacitor would need to be quite large and, bearing in mind that only paper or mica dielectrics were available, the cost would be excessive.

I don't know who the genius was who decided to make use of the reactance ratio of the transformer to solve the primary capacitor problem by installing a "Timing" or "Buffer" capacitor across the secondary winding — in this case a 0.008 μF capacitor (X_c at 100 Hz = 200 kΩ). Bearing in mind that the transformer ratio is 30 (180/6), then the reactance ratio is 900 (X ratio = E ratio^2). Hence the reactance reflected across the primary is 200 k/900 = approx 220 Ω. At 100 Hz this resolves into the equivalent of a capacitor of about 8 μF. A capacitor of 8 μF (400 volt working) would have been too large

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and too expensive to be practicable. The vibrator was quite happy to work into a load made resonant by a capacitor which did not physically exist (across the primary). Incidentally the 1000 volt rating of the 0.008 μF capacitor was necessary to take care of the voltage spikes.

Overall, an interesting application of the reactance ratio as exhibited by a transformer and an interesting piece of equipment from a bygone era. The vibrator power supply had many other applications. One I remember converted 32 Volts DC to 240 volts AC for use on farms. Another, used by a professional photographer, converted 4 volts to 2000 volts to fire the flash. The vibrators in German made units were labelled "Zerhacker" which loosely translated means "chopper-upper". DC-DC converters are, of course, still in use today, but low frequency mechanical vibrator switching has been replaced by semiconductors operating at a much higher frequency.

Eventually car radios and domestic receivers for operating from 6 and 12 volt batteries were produced by the tens of thousands in this country, the majority using the mechanical vibrator. A particularly efficient vibrator designed for use with domestic radios had synchronous secondary contacts on a split reed arrangement which mechanically rectified the transformer secondary voltage, thus eliminating the need for a power consuming rectifier valve.

The years 1929 to 1960 were a period of continuous rapid change, but with effort one could keep a finger on the pulse of developments. The mind boggles at the rate of change from 1960 to date. I never cease to marvel how young people, breaking into the industry are able to cope. It would appear that the only hope of success now is to specialise.

*27 Devonport Terrace Ovingham SA 5082

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Help stamp out stolen equipment — always include the serial number of your equipment in your Hamad

DIGICOM with an AAPRA Modem

Murray Burford VK5ZQ describes how he solved the problem of using Digicom software with his C64 computer and an AAPRA modem.*

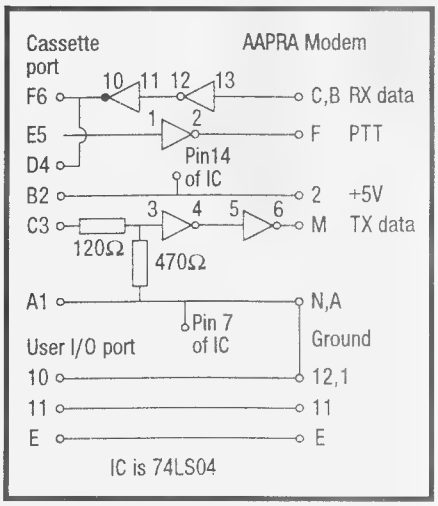
I had been reasonably satisfied with the software AAPRA had supplied with their modem kit for packet and saw little need to try DIGICOM, which many amateurs seemed to be using.

A copy of DIGICOM had been given to me but, as the AAPRA modem transfers its data via the user IO port of the C64 and DIGICOM uses the C64 cassette port, there was a compatibility problem.

While I was a little intrigued to try DIGICOM with the AAPRA modem, real motivation didn't come until another amateur decided to give packet a go, maybe following a little prompting. He had purchased a local modem kit and opted for DIGICOM.

Well, I could make quite a story out of my efforts to use the AAPRA modem. Using incomplete information, conflicting information and not really knowing what I was doing, I came to know frustration and a few new words.

However, with input from VK2AUQ, VK5RG and VK5ZAH, an adaptor



was built to plug into the AAPRA modem and the C64, using the connections as shown in Fig 1. Now everything works fine!

The AAPRA modem comes in a neat die cast aluminium box. The adaptor requires a double sided piece of pc board edge connector.

*261 Belair Road Torrens Park SA 5062

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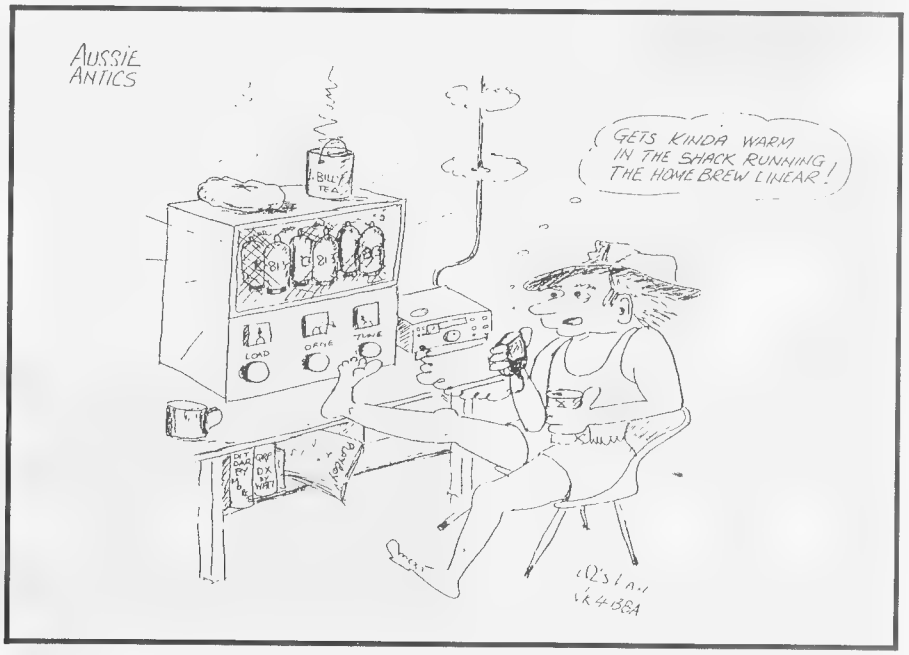

ALARA

*Robyn Gladwin VK3ENX **

LETTER TO MARGARET

Margaret Loft, VK3DML,
ALARAMEET Co-ordinator,
Castlemaine. Victoria.

Dear Margaret,

On behalf of all ALARA members and friends, I would like to extend sincere thanks to you for your wonderful work in organising the 1993 ALARAMEET.

It is no easy task to book suitable accommodation, arrange venues and suggest activities for over 80 people. You accomplished all this in a most efficient manner, but you also added the extra touches such as the hand embroidered name badges and memento ribbons for the YLs and the souvenirs of Castlemaine for the OMs. Participants appreciated the clear maps of the area which you provided and you deserve congratulations for keeping the program running smoothly throughout the entire weekend.

Please also thank the members of your team, Ron Atkins VK3BYM, Judy Atkins VK3AGC, Ray Taylor VK3FQ, Michelle Taylor VK3NSU, Colin Eyre VK3CWE, Graham Sutherland VK3AGS, and Pam Carter for their catering expertise; Annette Whyte, Kay Fairbairn and yourself for expert embroidery skills; Geoff Cartwright VK3NTN, for being the official photographer; Erika Bartz VK3AEB, for her work on the programs and Jenny Adams VK3MDR, for making and decorating the ALARAMEET cake.

Finally, we would like to thank your husband, George VK3AGM, and the other members of your family, for the support and encouragement they have given you during the past three years.

I am sure that the radio amateurs from three New Zealand call areas, including the President of WARO, Dawn Young ZL2AGX, and those representing five Australian states, will long remember the 1993 ALARAMEET in Castlemaine which you made possible.

33 Robyn

WOMEN IN RADIO

Heather Pike VK2HD

Heather's first experience of radio operating was as a wireless telegraphist in the Air Force during World War 2 from 1942 to 1945. After the war Heather was busy on the home front with the usual domestic situation and did not carry on with radio until taking out an amateur licence in 1961 with her present call of VK2HD.

Heather Pike, VK2HD, operating her amateur station.

Her husband Ron had the call of VK2ACU, and the two of them could be heard operating on all bands while chasing local and DX contacts. After Ron became a Silent Key, Heather was kept busy on air by all her DX friends.

In 1975, when the ladies' organisation was formed, Heather was one of the founding members. She has been a continuous member of ALARA and has helped the club grow worldwide by sponsoring many overseas members into it. During 1976/77 Heather was the treasurer and she willingly supported ALARA when they held the callsign VI88WIA during Australia's Bicentennial Year.

Heather's station is a very neat set up in one corner of the house with a magnificent antenna array that would be the envy of any city dweller. However, she does have problems. Being in the dry north-west, her antennas are exposed to severe winds and rip snorter thunderstorms. Another problem puts Heather off the air each evening — birds! Sometimes there are over 250 galahs perched on a very drooping beam at sunset. The distributed capacitance puts the antenna off tune and the VSWR rises considerably.

While Heather has over 307 countries confirmed, she has only recently applied for her DXCC. Despite this, tucked away in a large filing system is a very large collection of all sorts of awards from many countries.

Heather has done a great deal for women in amateur radio by extending the hand of friendship to all amateurs on the bands. She can be heard on air every day, often assisting others to make contacts with rare countries on various DX nets, maintaining her regular contacts and occasionally running the DX nets when the usual operators are unable to be on air. She embodies the true amateur spirit in her operating techniques and her willingness to help others.

Raidie Fowler

Raidie, pictured attending one of the VK3 luncheons, joined ALARA in November, 1976. She was Vice President from 1978 to 1979, and President until October, 1981. All VK3 ALARA Birthday lunches have been held at her home since the 12th Birthday of the Association in 1987.

Raidie Fowler at a VK3 luncheon in July 1993

Raidie and her husband, Ray VK3BHL, have 3 children and 8 grandchildren. Their ancestors, the Allnutts and the Fowlers, arrived in Australia in 1854 on the ship "Grand Trainon", never realising that their great grandchildren would one day meet and marry.

ALARA members would like to acknowledge the contribution Raidie has made to amateur radio and thank her for her encouragement and support over the years.

**PO Box 438 Chelsea 3196 VK3ENX@VK3YZW*

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Deluxe Handheld FM Paging Transceivers

The superb FT-415 and FT-815 hand-held FM transceivers are compact and rugged, with dual-microprocessor control as well as new high-speed automatic battery-saving (ABS) for longer operating time. A die-cast rear case, polycarbonate front panel and battery case plus rubber gasket seals around controls and connectors ensure reliability in demanding environments. The display and keypad can both be backlit for night-time viewing, and the 5.5-16 volt DC supply jack can be used to power the transceiver and charge a 7.2V NiCad battery pack. A 36mm speaker provides low distortion audio, while in-built VOX circuitry is included for use with the optional YH-2 headset. Advanced features include two independent VFOs, keypad frequency entry, 41 tunable memories, instant recall CALL channel, and a variety of scanning modes. The FT-415 has Automatic Repeater Shift (Australian version), which activates whenever you tune to a standard repeater sub-band, plus extended receive coverage. Both have DTMF-based selective calling and paging facilities which allow you to program a 3-digit ID code so other transceivers can 'page' your transceiver. Comes with a high-capacity 7.2V, 1000mA/H NiCad battery, belt-clip, carry case and approved AC charger.

FT-415 Cat D-3610 **$599**

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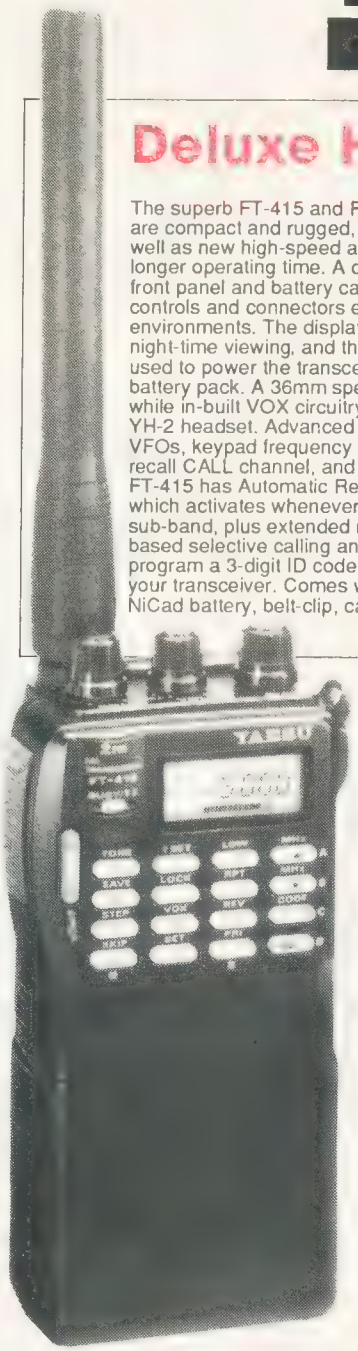
Frequency range:	FT-415 144-148MHz (140-174MHz extended receive) FT-815 430-450MHz
Size:	55 x 146 x 33mm
Transmitter:	
Power Output.	FT-415 2.0W (at 7.2V) FT-815 1.5W Both models 5.0W at 12V
Receiver:	
Sensitivity:	better than 0.158uV,(12dB SINAD) both models, Ham bands only



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FT-290RII 2m Multi-Mode Transceiver

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FL-2025 Amp

Turn your FT-290RII into a powerful mobile/base transceiver with the FL-2025 amplifier. This clip-on RF amplifier will replace the FBA-8 battery holder on the FT-290RII and boost the transceiver's output to 25 watts. Requires 13.8V DC

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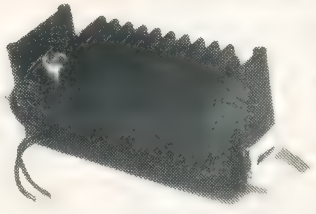

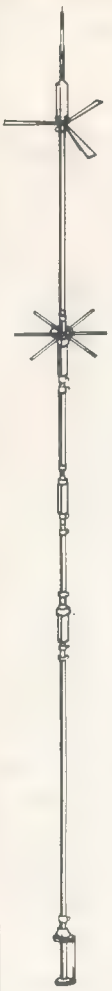

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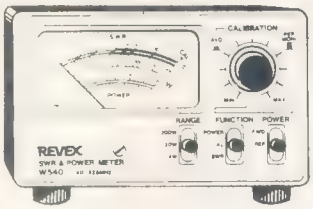

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2m/70cm Magnetic Mobile

The black TM-723M is a slimline, compact dual-band mobile antenna that's supplied with a low-profile magnetic mount and low-loss coax cable, making it ideal for city drivers who can't use a long antenna. While only 0.7m high, it provides 1.7dB gain on 2m and 4.7dB gain on 70cm and has a conservative maximum power rating of 50W
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SAVE $20

2m/70cm Mobile Antenna

The ST-7500 is a high-quality medium-sized dual-band antenna that uses a ground-independent design and tiltable stainless steel whip structure to provide excellent mobile results. It's just 1m long, yet provides approximately 3dB gain on 2m and 5.5dB gain on 70cm with a maximum power rating of 150 watts. Requires an SO-239 antenna base or SO-239 magnetic base.
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The ST-7800 is our best long-range dual-band mobile antenna, providing high gain (4.5dB on 2m and 7.2dB on 70cm) while only 1.5m in length. It incorporates an inbuilt tilt-over mechanism and has a maximum power rating of 150 watts. The ground-independent design also allows the use of gutter or boot/bonnet brackets for easier mounting. Requires an SO-239 antenna base.
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SO-239 Base/Lead Set

A convenient way to mount a PL-259 type antenna. This quality Japanese SO-239 base is pre-wired with 4m of low-loss coax cable and has a PL-259 already fitted for connection to your transceiver.
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A powerful Japanese magnetic mount for use with PL-259 antennas. It's supplied with 4m of quality coax cable and fitted PL-259 plug. Suits small to medium antennas such as the ST-7500.
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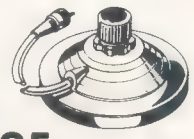

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STORES ACROSS AUSTRALIA AND NEW ZEALAND

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AMSAT Australia

Bill Magnusson VK3JT *

Four new amateur radio satellites launched

A dramatic night time launch from Kourou at 01:45 UTC on 26th Sept 1993 with the launch window almost closing saw an ARIANE launch vehicle lift off to carry seven satellites into orbit. Of these seven satellites, four are of general interest to radio amateurs.

POSAT-1 is a 50 kg satellite built by Surrey Satellite Technology Limited (SSTL) of the University of Surrey, for LNETI (Portugal). Its mission is to receive and transmit earth images, determine its position using GPS, make radiation measurements, and receive and forward messages.

Uplink: 145.925/145.975 MHz
Downlink: 435.250/435.275 MHz (435.250 MHz is the primary frequency)
Speed: 9600 bps (38.4 kbps probably)

KITSAT-B is a 50 kg satellite built by Korean Advanced Institute of Space Technology (KAIST). Its mission is to take CCD pictures, process numerical information, measure radiation, and receive and forward messages.

Uplink: 145.870/145.980 MHz
Downlink: 435.175/436.500 MHz
Speed: 9600 baud

EYESAT-A is 12.5 kg and was built by Interferometrics (USA). Its mission is experimental monitoring of mobile industrial equipment. It also carries an amateur radio payload which has the following frequencies:

Uplink: 145.850 MHz
Downlink: 436.800 MHz
Speed: 300 — 9600 baud

ITAMSAT is a 12 kg satellite built by AMSAT-ITALY. Its mission is to store and forward Amateur Radio messages in a similar manner to AO-16, LU-19, KO-22, and KO-23. Its transponder frequencies are as follows:

Downlink:	435.867 MHz (primary)	PSK 1200 baud
	435.822 MHz (secondary)	PSK 1200 baud
		AFSK 1200 baud (FM)
		9600 baud (G3RUH)
		analog transponder (FM)
Uplink:	145.875 MHz	1200 baud Manchester/4800 baud
	145.900 MHz	1200 baud Manchester/4800 baud
	145.925 MHz	1200 baud Manchester/9600 baud /exper
	145.950 MHz	1200 baud Manchester/9600 baud

National co-ordinator
Graham Ratcliff VK5AGR
Packet: VK5AGR@VK5WI

AMSAT Australia net
Control station VK5AGR
Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies: (again depending on propagation conditions)
Primary 7.064 MHz. (Usually during summer).

Secondary 3.685 MHz. (Usually during winter).

Frequencies +/– 5 kHz for QRM.

AMSAT Australia newsletter and software service
The newsletter is published monthly by Graham VK5AGR. Subscription is $25 for Australia, $30 for New Zealand and $35 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia
GPO Box 2141
Adelaide SA 5001

At the time of writing good telemetry is being received from all these new amateur satellites and the latest kep sets already contain their elements. Since they were all launched at once they have been allocated consecutive OSCAR numbers according to the date on which it was first announced they would be built.

Good news regarding UO-11

Controllers at the University of Surrey have been successful in regaining command of the UoSAT-2 spacecraft after a short period off-air. The "command lost timer" timed out at roughly 18:37 UTC on Saturday 18 September and during the next pass over the UK controllers were able to command the spacecraft to turn on its 70 cm beacon. An examination of telemetry showed that the spacecraft is in good health. Every effort will be made to return UO-11 to an operational state as soon as possible.

Bad news regarding ARSENE

It seems the amateur satellite fraternity has lost ARSENE. It was reported recently that, just as the instructions were about to be transmitted which would have put ARSENE into a temporary shut-down mode, the transmissions from the satellite ceased of their own accord and have not been heard since. Control stations put in a concentrated effort to restart the transmitter but to no avail. ARSENE had been plagued by problems from the time it was launched. Although the launch went smoothly and the orbit is by far the best of any amateur satellite the orientation has been a problem. It was very selective as to the MA times when signals could be heard indicating attitude difficulties. The mode B transponder failed shortly after turn-on and despite concentrated listening efforts by many well equipped stations it was never heard again. This left only the mode S system operating. Due to the frequency being nearly 50 MHz away from the usual 2.4 GHz satellite band many stations were unable to use this mode until they updated their equipment for the ARSENE frequency. Up to the time of the failure more and more stations were doing just that and ARSENE was responsible for the biggest ever upsurge of amateur activity in the 13 cm band. It's a great pity that it has failed. Southern hemisphere amateurs in particular will mourn its passing. The high altitude, equatorial orbit was the first which did not favour the northern hemisphere and it put all amateurs, world-wide on an equal footing as far as access was concerned.

Good conditions on OSCAR-13

Recently we have seen a couple more rounds of excellent conditions on OSCAR-13. The windows from the south eastern VK states into Europe have been long, productive and at fairly friendly times. I have a number of friends who are not satellite operators but are VHF/UHF DXers. When ever we are coming into a set of conditions like that I always alert them. They have large high gain antenna arrays and although they can't elevate them this is of little consequence as the windows from Melbourne to London never exceed 8 or 9 degrees elevation, well within the beam of these antennas. I supply them with the appropriate data on times and azimuth bearings and off they go. These sessions are always

eagerly awaited and talked about long afterwards. Try this if you have friends with reasonably good antenna systems. You could easily see them becoming interested in entering the satellite field seriously. The recent round saw windows of several hours and squints right down to 1 or 2 degrees. Remember, OSCAR-13 is slowly coming south. At last report its apogee was at 28.7 degrees north and moving south at about 0.054 degrees per day. At that rate it will be over the equator in about 530 days, that is about the middle of 1995. As predicted the perigee height of OSCAR-13 has risen to 810 km from its low last year of some 600 km. Unfortunately this will not continue for much longer. The computer models predict it will soon begin to fall and plunge deep into the atmosphere in 1996. So enjoy it while you can, at least we can look forward to improving conditions right up to the end.

A NEW CONCEPT

Ground station location/tracking using amateur satellites and packet radio

A number of accounts are to hand on this subject in which a BText broadcast from packet stations can be used to locate and display their positions on a map when digipeated through an amateur satellite. More on this next month.

359 Williamstown Rd, Yarraville VIC 3013
Packet: VK3JT@VK3BBS

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WICEN

News from WICEN (NSW) Inc

The most important event in November is the Big NSW/Vic Bike Ride, starting on 27th November and ending on 12th December. This is a large-scale exercise, and Simon VK2CSC requires as many people as possible, even if they can only spare a day or so.

At the time of writing, only a few volunteers from VK2 have come forward, and it appears that VK3 will be running the show! Further information on this event can be obtained from your co-ordinator, or from Simon VK2CSC@VK2CZZ (packet) or (049) 50 4432 (after hours).

The address of WICEN (NSW) Inc is PO Box 123, St Leonards, 2065. WICEN (NSW) conducts nets at various times; the only one I know about is the Sydney VHF Net every Thursday night at 2130 local time on repeater 7150 in Chatswood.

Dave Horsfall VK2KFU
Publicity Officer WICEN (NSW)

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AWARDS

*John Kelleher VK3DP — Federal Awards Manager **

ALARA Award

This Award is available to YLs, OMs and SWLs for contacting ALARA members on or after 30th June 1975, as follows: VK/ZL: 10 contacts, including 5 Australian Call Areas; and DX: 5 contacts, including 4 Australian Call Areas. All contacts must be made from the same Call Area. Repeater contacts and official ALARA net contacts do NOT qualify. Special endorsements are available for Mixed, CW, Phone, All 28 MHz etc, etc. Endorsement stickers are available for each 10 (DX 5) additional members contacted.

Applicants must submit a log extract certified correct and signed by two other amateurs, under the following headings: Date, Time UTC, Band, Mode, Callsign and name of ALARA member contacted, report sent, and report received. In lieu of certification, QSL cards must be forwarded. Full name, address, signature and callsign of the applicant are required. Fee (to accompany application): 3 Australian dollars, or 4 IRCs. Additional stickers can be applied for at a later date, costing $1.00 Australian per application.

Applications to: ALARA Awards Custodian, Jessie Buchanan VK3VAN, 4 Milford Crescent, Karingal, VIC, 3199, Australia.

YL Awards

The following is a list of YL Awards extracted from the K1BV Awards Directory for 1992.

ARGENTINA: LU-YL: Contact 5 LU YL operators. No restrictions as to time and band. Fee of US$5.00 to:- Award Manager, Radio Club of Argentina, PO Box 1127, Buenos Aires 1000 Argentina.

BELGIUM: BYLC: Issued by the Belgian YL Club. All bands and modes. VK need 15 points. YL members of UBA count for 3 points, while non-members count 1 point. GCR list, and a fee of US$5.00 to:- Varelst Mia, ON6OW, Antwerpstrasse 141, B-2500 LIER Belgium.

CANADA: CLARA: Work 5 YL stations in 3 Canadian call areas (limit 2 VE3) all bands. Endorsements available. Fee is CAN$2.00 to:- Cathy Hrischenko VE3GJH, 56 Stockdale Crescent, Richmond Hill Ontario L4C 3S9 Canada.

FINLAND: FINNMAID: Contact 3 Finnish YL stations.Fee US$3.00 to:- SRAL Award Manager, Jukka Kovanen Varuskunta 47 as 11, RIIHIMAKI 31 SF-11310 Finland.

FRANCE: DIPLOMA des YL's de FRANCE: Proof of contact with 5 French YL stations and one on 3 different continents.(8 cards). Fee US$6.00 to:- Gilda le Ball, Quilvidic — Mellac, F-29130, Quimperle France.

JAPAN: YL-CW-AJD: Contact a licensed YL in each of the 10 districts (JA1-0). GCR list and fee of 10 IRC to :- Nobuko Nishigori JA3UPR, 2-6-11 Hirosedai, Kaai-machi, Kitakatsuragaigun, NARA-ken 636 Japan.

NEW ZEALAND: WARO: Work 12 members of WARO. No fee mentioned,but postage required for return of certificate. GCR list to:- Vicki Shaw ZL1OC, PO Box 2088, Whakatane, NZ 3400.

SWEDEN: YL-NINGEN: Work 7 Swedish YL's. GCR list and 3 IRC to :- Vastkustens YL Group SK6QL, Box 6015, S-424 06, Angered, Sweden.

USA: DXCC-YL: Contact licensed YL's from 100 DXCC countries on any authorised bands. Fixed or Mobile contacts OK. No cross-band contacts. GCR list in alphabetical order of ARRL countries list. List must include country, callsign, date, time, frequency, RS/T and YL's name. No fee mentioned, but include return postage.Apply to:- DXCC-YL Certificate Custodian, 3118 Eton Road, RALEIGH NC 27608 USA.

USA: WAC-YL: Contact one YL operator in each of the 6 continents, Europe, Asia, Africa, North America, South America, and Oceania. All bands and modes. You may send the cards or double-sided photocopies of the cards. GCR list accepted if signed by 2 YLs or a Club Officer. Fee is US$2.00. Apply to:- Leanna Shaberley KB8RT/7, 2635 W Sunrise Drive, Phoenix AZ 85041 USA.

USA: WAS-YL: Contact a licensed YL operator in each of the 50 US states. DC may be substituted for Maryland. GCR list in State alphabetical order, including all QSO details and the YL operator's name. Fee is 3 IRC. Apply to:- Richea Brigance KU5L, Rt 2 Box 197, Booneville, AR 72927 USA.

In conclusion, the **USA-XYL** Award. Any OM may nominate his XYL for this special certificate, which recognises the "aid and comfort during contests, field days, late QSOs, dying bands, and heavy QRM". It further recognises her brave disregard for personal safety in periodically cleaning your shack. Apply with XYL's name and a fee of US$2.00 to:- Elizabeth S Clark W4GGQ, 41 Lenape Drive, Miami Springs, FL 33166 USA.

Gwen Tilson VK3DYL

Gwen was first licensed as VK3PGT in December 1980, after a few gruelling months "'schooling" by her OM Tom VK3KFW and son David, now VK3UR. "They had a pretty dumb pupil" Gwen recalls "and there was a loud, collective sigh of relief when the results came through."

Two days after getting on air (using David's FT7 and a long wire) a rare DX station called Gwen for a chat — it then gradually dawned on her that having a YL's voice could prove a distinct advantage in DXing, particularly in dog-piles. And so Gwen started on that long, long haul to the DXer's ultimate goal of working all current DXCC countries. Now, 12 years on, this ambition has been achieved with a lot of fun along the way.

The first step was to upgrade her licence (which she did as soon as she had worked DXCC) to VK3KYL, and then VK3DYL. The station has also been upgraded to a TS430S and TH3, helped occasionally by an FL2100Z amplifier.

In between chasing new countries and chatting to friends all round the world, Gwen has enjoyed using special VK callsigns, sorting cards for the VK3 Inwards QSL Bureau, acting as QSL Manager for a VK0 friend, helping with JOTA and operating portable W3, W6 and KL7. Last year she visited ARRL HQ and received her Honor Roll plaque. She also holds DXCC-YL, which took her 10 years to work!

Gwen is grateful to all who have helped her — from the "DX spotting gang" on 2 m to the friendly net controllers and the anonymous voices who have asked rare DX stations to "listen for the VK YL calling you." Her family has suffered patiently the erratic times for meals when the DX is coming in, and David's agility on the roof fixing antennas has been invaluable. Gwen's only complaint is "Why didn't someone tell me about amateur radio years ago?"

**PO Box 300 Caulfield South 3162*

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Sign up a new member today — We need the numbers to protect our frequencies and privileges.

CLUB CORNER

Adelaide Hills Amateur Radio Society (AHARS)

The AHARS annual electronic sale will be held on Saturday November 13 between the hours of 9.30 am and 2.00 pm. The venue is the same as for previous years at the Westbourne Park Memorial Hall, 390 Goodwood Road, Westbourne Park. The hall is about 300 metres south of the Cross Road intersection. All radio amateurs and others interested are invited for a day of trading fun. This is the day to get rid of that surplus gear or to find the odd special component you need.

Those interested in selling gear must book table space and this can be arranged by ringing Geoff Taylor VK5TY on (08) 293 5615. The doors will be open for trading at 9.30 am but vendors should present themselves at 8.30 am to prepare their tables. The club will charge a commission of 10% of gross sales with a maximum of $10 on any one item. This assists to offset the cost of hiring the hall and other expenses. All sales are by negotiation between the buyer and seller.

Refreshments will be available within the hall. Test equipment and an operator will be available to carry out simple checks on components.

Lloyd Butler VK5BR
Vice Pres AHARS

Australian Naval Amateur Radio Society

For those who missed the operations of ANARS club stations VK1SEA, VK2SEA and VK1VHP during Navy Week 1993, the operation will be repeated on two days during November to commemorate significant events in the history of the Royal Australian Navy.

Tuesday November 9: Anniversary of the WW1 battle between the Australian light cruiser HMAS SYDNEY (1) and the German cruiser SMS EMDEN off the Cocos Keeling Islands. This was Australia's first naval victory.

Friday November 19: Anniversary of the WW II battle between the Australian cruiser HMAS SYDNEY (II) and the German raider KORMORAN off the West Australian coast which led to the loss of both ships and the entire crew of HMAS SYDNEY (II).

Nominated frequencies (+/– QRM)

CW	3532	7020	14052	21052	21132
SSB	3620	7090	14175	21175	

The Australian Naval Amateur Radio Society is pleased to announce it has received recognition from the world's largest naval/maritime amateur radio organisation — the American based Society of Wireless Pioneers.

Membership of the ANARS is open to all amateurs and swls with a professional naval or maritime background. Details can be obtained from the Hon Secretary (VK2ALG) at 467 McKenzie Street, Lavington, NSW 2641 or by telephone on (060) 25 3292.

Terry Clark VK2ALG
Hon Secretary ANARS

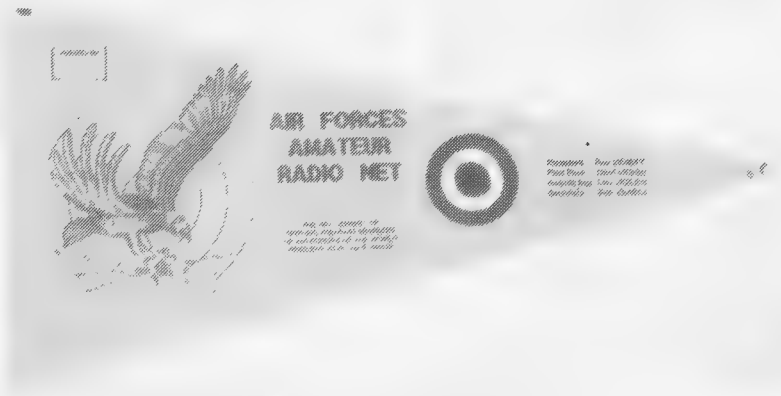
Air Forces Amateur Radio Net

The Air Forces Amateur Radio Net had their new award on display at the Nambour Sunfest. The award is a 24" x 12" pennant, made of light blue polyester fabric with the Net eagle and information screen printed in dark blue, plus the red, white and blue roundel.

The award is aimed at those with an interest in air forces.

More information can be obtained on the Net of a Tuesday evening.

Bob Neville VK4ACL
Hon Secretary AFARN



Air Forces amateur Radio Net award pennant.

Radio Amateurs Old Timers Club Australia

Change of broadcast times

With the advent of Daylight Saving time our monthly series of broadcasts and call backs will be one hour earlier in November, December and February. As usual there will be no broadcast in January.

Times and frequencies for the above three months will be:

2 metres and 40 metres	2300 UTC
20 metres beaming north	0000 UTC
20 metres beaming west	0100 UTC
80 metres	0930 UTC

Members are asked to note that the November broadcast will be on November 1st, not November 2nd as printed in the September issue of "OTN". Conditions on 40 metres have been poor recently so perhaps our 80 metre transmission will become more helpful.

Allan Doble VK3AMD

Moorabbin & District Radio Club Inc

Members and visitors attending the club's general meeting on the third Friday of each month are assured of an interesting evening. Speakers at recent meetings have been Tony Burt VK3TZ, Jindalee, OTHR; David Turnbull, co-ax cables and connectors; and John Day VK3ZJF, PACTOR.

Our club station VK3APC was active and scored very well in both the Novice and Remembrance Day contests. Plans have now been made to go ahead with "Project 70". This is a money raising effort to finance equiping VK3APC with 70 cm gear. The first event in this project will take place in the club rooms on Friday evening November 5th. It will take the form of a sale of used gear, some from deceased estates and some from club members. Selling is restricted to club members only, but prospective buyers are invited from all over and will be most welcome.

Allan Doble VK3AMD
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CONTESTS

*P Nesbit VK3APN — Federal Contest Coordinator **

Contest Calendar Nov 93 — Jan 94		
Nov 1/7	HA-QRP 80m CW Contest	(Oct 93)
Nov 13	ALARA Contest (Mixed)	(Oct 93)
Nov 13/14	WAE RTTY DX Contest	(Jul 93)
Nov 13/14	OK-DX CW Contest	(Oct 93)
Nov 13/14	ARRL International EME Competition	
Nov 27/28	CQ World-Wide CW DX Contest	(Sep 93)
Dec 3/5	ARRL 160m Contest	
Dec 11/12	ARRL 10m Contest	
Dec 26/		
Jan 16	WIA Ross Hull Memorial Contest	
Jan 1	ARRL Straight Key Night	
Jan 15/16	VHF/UHF Field Day	
Jan 15/16	HA DX CW Contest	
Jan 28/30	CQ WW 160m DX Contest	

As I write this in early October, conditions are continuing to improve. Weak stations seem to be easier to work, and there have been some good long-path openings on 40 in the afternoons, evidently extending as far west as VK6! Hopefully these good conditions will by now be spilling over into the "biggies" (CQ-WW DX, phone & CW). If things go really well there might even be some good DX openings during the 160 m DX contests in December and January. Now is the time of course, to perform all those antenna repairs and improvements you've been putting off through the winter months!

Many thanks to the following for their help, information, and inspiration: VK2SRM, VK4LW, VK5OV, ZL1AAS, ZL1GQ, CQ, QST, and Radio Communications. Please keep the letters coming, including any spare copies of results. Until next month, good contesting!

73
Peter VK3APN

Contest Details

The following contest details should be read in conjunction with the "General Rules & Definitions" published in April AR.

ARRL 160 m DX CW Contest

December 3/5, 2200z Friday — 1600z Sunday

The object in this contest is to work as many W/VE stations as possible. Categories are: Single Operator (QRP to 5W, Low Power to 150W, and High Power above 150W O/P), and Multioperator single TX. Exchange RST (/MM and /AM stations should add ITU region 1, 2 or 3). W/VE will add ARRL/CRRL Section. Note that 1830-1850 is recommended for intercontinental QSOs.

Score 5 points per QSO. The multiplier is the total number of ARRL/CRRL sections plus VE8/VY1 worked (max 77), and the final score equals QSO points x multiplier. Include a dupe sheet of 200+ QSOs. Logs on MS-DOS disk are welcome. Send logs postmarked no later than 30 days after the end of the contest to ARRL Contest Branch, 225 Main Street, Newington, Connecticut, CT 06111. Certificates will be awarded to the top scoring station in each category in each DXCC country. Note that the use of non-amateur radio means of communication during the contest (eg telephone) is not allowed for the purpose of soliciting QSOs.

ARRL 10 m Contest (CW & Phone)

December 11/12, 0000z Saturday — 2400z Sunday.

The object of this contest, which runs on the 2nd full weekend of December each year, is for amateurs worldwide to work as many stations as possible on 10 m phone, CW, or mixed. Operate 36 hours maximum; listening time counts as operating time. Categories are as for the 160 m contest (see above). Send RS(T) plus serial number; W/VE will send RS(T) plus state or province. CW entrants should stay below 28.3, avoiding beacon frequencies. Note that 28.09 — 28.13 has been set aside for slow speed code 10-13 wpm. Stations entering the mixed mode section may work stations once on CW and once on phone.

Score 2 points per phone QSO, 4 points per two-way CW QSO, and 8 points for CW QSOs with US novice or technician stations signing /N or /T (28.1 — 28.3 MHz only). Multipliers are the 50 US states plus District of Columbia, plus Canada NB NS (VE1), PEI (VE1/VY2), PQ (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NWT (VE8), YUK (VY1), NF (VO1), LAB (VO2), plus DXCC countries except US and Canada, plus ITU Regions (/MM & /AM QSOs only). Multipliers are counted separately on each mode. Final score is total QSO points x total multiplier. Include a dupe sheet for 500+ QSOs. Logs should be sent as for the 160 m Contest (see above).

Results of Merv Stinson Memorial Sprint Contest

The results of this 80 m contest, held over a 1 hour period in June, show a good turnout of VKs, ZLs, a P2, and a VE, proving that the sprint contests really work. Many thanks to Rick Chilcott VK4LW for the following information:

VK2LEE	38	1st VK2 & Novice	L40018	17	1st VK SWL
VK2CKW	27		VK5ATU	42	1st VK5
VK3NFJ	29	=1st VK3	VK5UE	26	

VK3DD	29	=1st VK3	VK7CK	30	1st VK7
VK4YB	73	1st VK & VK4	ZL1BVK	49	1st ZL
VK4OH	61	2nd VK	ZL1AGO	45	2nd ZL
VK4HF	59	3rd VK	ZL1HS	31	3rd ZL
VK4YZ	52		ZL2AJB	37	
VK4EFX	47		ZL1AAS	29	
VK4BB	42		ZL2BSP	21	
VK4MCA	23		ZL4OZ	19	
VK4NAD	22		P29RB	8	1st P2
VK4VG	22		VE7BS	12	1st DX
VK4FRZ	18		ZL1AMU	Check Log	

Results of 1993 Australasian Sprints

Entries for the 8th Australasian Sprints were a pleasing 17 (CW) and 30 (phone), although it is disappointing that less than a quarter who were active submitted logs.

Despite propagation and noise problems experienced by some operators, the CW scores were very good, whilst in the phone section they were generally similar to last year. The earlier start seems to have been readily accepted, particularly by VK6s, and everyone appeared to have enjoyed themselves. However entrants should remember that the contest is only for QSOs between VK, ZL and P2.

The Adelaide Hills Amateur Radio Society and the VK5 Division of the WIA congratulate the overall winners, Dale Cavies VK5AFO (CW), and John McRae VK5PO who had an outstanding score in the phone section, both of who have had consistently high scores in the past. The winners in the individual call areas are also congratulated.

This year saw two novices enter the CW section, with the certificate being won by Max Bruce VK3NZO. Congratulations to both for their good results and hopefully other novices will be inspired to take part next year.

Over the years many have regularly entered the Sprints, but special mention should be made of SWL Charles Thorpe L40018 who, I believe, has participated in every one.

Results, together with points claimed or allowed, are shown below. Asterisks indicate certificate winners.

73, David VK5OV

CW

VK2QF*	16	VK5RG	12	VK4XD	30
VK2VZB	10	VK5UE	4	VK4NAD	18
VK3XB*	18	VK6BN*	18	VK4KJO	13
VK3VB/P	16	VK8AV*	12	VK5PO**	76
VK3NZO*	15	ZL1GQ*	18	VK5ON	63
VK3OZ	12	**PHONE**		VK5AFO	61
VK4OD*	21	VK1JE*	35	VK5XY	53
VK4TT	16	VK1KLB	16	VK5AC	49
VK5AFO**	23	VK2FUH*	23	VK5UE	31
VK5PO	19	VK3NFJ*	44	VK5ADD	31
VK5ADD	17	VK4HF*	59	VK5ZD	20
VK5ATU	14	VK4OD	32	VK5RV	20
				VK5TY/P3	15
VK5DUG	7	VK6PGG	23	ZL1AGO	30
VK6ANC*	53	VK8AV*	31	P29RB*	12
VK6XG	39	ZL1BVK*	47	L40018*	26
VK6BN	32	ZL1HS	31		

RESULTS OF 1992 VK-ZL-OCEANIA DX CONTEST

Finalisation of the results for the 1992 contest was delayed, due to a large batch of logs from Europe being held up in the mail. Asterisk indicates top scoring stations in each section and country. Detailed VK results were published in March AR. Many thanks to John Litten ZL1AAS, the manager of the 1992 contest, for the following information:

Top Scorer in Each Continent:

	Phone	CW	Phone SWL	CW SWL
Oceania	YC8PN	YB6TI		
N. America	K3ZO	K7JYE		
S. America	No entry	No entry		
Europe	UB7W	UB3JWW	UB5-073-1610	UA6-150-1367
Africa	AM8TH	7Q7XX		
Asia	UA0SAU	UA0SAU		

PHONE RESULTS:

Oceania:

V73SG*	2436	EA5CKP	80	JF2PTA	1480
YC8PN*	21824	AM2CR	30	7M1GAG	1472
YC8NA	14756	G3SNN*	5160	JL1DRX	1428
YC0PGN	6840	G3NAS	5110	JF2LEX	1296
YB1DYB	2440	HA5BPC*	54	JA5JP	1280
YC1BGI	2196	HB9DX*	768	JH2WHS	1184
YC8SSB	2176	IK0HTM*	198	JG1TVK	1056
YC2GAM	612	IK0QDB	8	JF3EIU	1020
YC0GPH	386	LA1TV*	154	JM1NKT	850
YC8OD	144	LZ2KRU*	810	JA1AB	782
VK2APK*	1554293	LZ3BS	234	JA0HYU	750
VK8AV	491381	OE1TKW*	48	JA4DHN	728
VK2AYK	456148	OG6IU*	3796	JR9NVB	700
VK2PWS	356963	OH2BVM	432	JA2IZA	690
VK3DZM	268800	OG7NW	2	JA2TK	672
VK4DMP	263097	OK1AD*	1804	JA0BPY	672
VK5AFO	195480	OZ4FF*	24	JA3CVJ	650
VK6WJH	84851	PA0QLD*	192	JK2VOC	560
VK4NEF	74965	SM0HTO*	520	JA0CJK	560
VK5PMC	59500	SP0LUV*	1400	JH1NXU	546
VK2PS	52530	SP1JXC	252	JA9IKL	528
VK2ARJ	46996	SP0DVP	196	JA2GHP	494
VK2XT	14784	UZ1OWZ*	4200	JE3KGT	480
VK2CJH	13209	UZ4HXY	4030	JA1SWL	468
VK3DRX	10950	UC1WWR*	12	JA6QDU	432
VK3ENX	2407	UB7W*	9672	JG1BSB	396
VK3SM	812	UB5EDU	7200	JA1STY	384
VK8BE	646	UB3JWW	5304	7M2CAG	352
VK5OE	check log	UY7E	4582	JK6ISK	374
ZL1BVK*	244052	UB4HO	4544	JA4ETH	342
ZL3TX	156052	RB5IIU	18	JG1RDV	336
ZL1IM	70007	YU7SF*	8	JA1RKI	280
ZL2AFY	40500	9A3CR*	7440	JA0YAK	252
ZL1AAS	check log			JH2HFD	224
		Africa:		JA1BDI	192
North America:		AM8TH*	50	JE8FFS	176
K3ZO*	3588	5U7M*	32	JP1LPH	150
VE3MX*	2			JF1PHJ	144
		Asia:		JH3AKD	140
Europe:		JA6BIF*	8820	JG1GBL	126
DL2VDX	3720	JA1HVS	6944	JA1IT	96
DL0SK*	3700	JA9KKD	3876	JH4LPY	84
DL8DSL	1900	JA7BEW	3820	JH1RMH	72
DL8UCC	1680	JE2UFF	3360	JR3KAH	72
DJ2JAA	168	JA5APU	2550	JG1TVC	60
DL8UTC	70	JH2JNU	2000	JE2IFM/1	60
AM7BA*	1430	JA1HFY	1950	JA3SSB	60
EA4BYJ	210	JA6EFT	1936	JA9XAT	60
		JA6CM	1628	JA6CDC	56
		JR7LVK	1596		

JA7HB	42	DL8UED	32	JL2LPX	3366
7M1JJB	40	DL1DQJ	8	JA1WYQ	3214
JG1RRU	40	DL1DQY	8	JJ1JGI	2320
JA8YEA	40	DL1DQD	Check log	JA1PUK	1950
JG3UOB/1	32	DL5AMF	Check log	JG1BSB	1900
7N1HFK	24	EA5CKP*	520	JA1AA/QRP	1804
JA9YAV	24	AM2CR	180	JA1AB	1680
JA1POS	20	AM5BZS	Check log	JA6BIF	1680
JN1FRL	18	G3GLL*	1440	JA0BPY	1610
JR2TRC	18	G3DYY	828	JA3ARM	1518
JN1OVF	16	G5MY	782	JA2GTW	1452
JH1PXY	8	G5RV	736	JA1RKI	1288
JA6BWH	4	HA5LZ*	672	JA9CWJ	1218
7K2PBB	2	HB9DX*	728	JF0SGW	1000
JT1BV*	48	IV3FSG	972	JA2ANR	680
UA0SAU*	18360	I0ZUT*	644	JA6QDU	600
RA0FA	10028	IK3JLV	448	JA1XCZ/4	576
UZ9XWH	3968	IK5TSS	360	JA5APU	570
UZ9CZO	3328	LA5WQ	Check log	JF7QUE	570
UZ9MXM	2300	LA7IJ	Check log	JA6BWH	544
UA9YJO	1240	LA9PEA	Check log	JK6ISK	336
UW0ST	1200	LY2BLA*	32	JH1PXY	312
UL7OB*	4556	OE1TKW*	286	JA7ARW	286
		OH2BCI*	4608	7L2UQY	264
CW RESULTS:		OH1TN	2236	JA4ETH	260
Oceania:		OH2YL	640	JK2VOC	234
YB6TI*	23940	OG7NW	50	JH1NXU	200
YC2ENE	3424	OH3TY/OH0*	3060	JJ7NUC	200
YB2BKJ	Check log	OH2EJ	Check log	JF2WXS	176
VK2APK*	1872520	OH6NH	Check log	JA2DN	120
VK8AV	1168512	OK1AD*	2228	JA8AJE	98
VI6ZH	707229	OK3KAG	2208	JR1DTN	84
VK2KM	554554	OK3CIR	1628	JA4AQR	75
VK9NY/2	533544	OK1TW	756	JN6CYC/1	60
VK6HG	286396	OK1BLC	588	JE0WJS	56
VK2DID	195494	OK3TUM	Check log	JA1AAT	50
VK6BB	190476	OZ1FTE*	1900	JG1RDV	50
VK4TT	129564	OZ4FF	198	JL2XCA	50
VK4XA	129213	PA3CNI	32	JE2IFM/1	32
VK2PS	85918	PA0PLN*	24	JE2LPC	32
VK4OR	56980	SM0NJO*	312	JF2MVI	8
VK5AGX	55176	SM0DZH	252	JF2LTH	8
VK4OD	23328	SM5BBS	Check log	JA0HJI	8
VK3VB	22308	SM5BDY	Check log	JG1RRU	2
VK4LV	19497	SP4AVG	Check log	JF2LEX	2
VK3XB	13529	SP9BBH	Check log	UA0SAU*	11074
VK2AIC	13166	TF3DX*	380	RA0FA	6956
VK7RY	7072	UZ1OWZ*	5476	UZ9CZO	3960
VK6IV	6600	UZ1AYZ	1462	UZ9XWH	3392
VK3DRX	3240	UA3XDF	198	UA0LCZ	3248
VK8BE	576	UA6BCE	50	UA9OA	1850
VK3KS	342	UA4ANZ	44	UZ9MXM	1776
ZL3GQ*	2416960	UA4YG	Check log	UW0ST	6
ZL1AIZ	818244	UA9XS	Check log	UL7OB	782
ZL2AGY	731000	UB3JWW*	8004	UL7BAY	384
ZL1HV	164112	UY7E	4970		
ZL1VD	160769	UB4HO	4692	**SWL PHONE:**	
ZL1AIH	45600	UB7W	4320	VK6-Peter Kenyon	42048
ZL3BJ	8250	RB4EK	418	VK3-Jon Finn*	5000
		RB5QI	160	JA1-7777*	4958
North America:		UB5TN	108	JA8-3339/1	128
HP1AC*	330	UB4JLF	Check log	I4-2865*	208
K7JYE*	2668	UC2ADM*	18	ONL-4003*	252
K3ZO	2300	UL8GWJ*	4320	SP-0189-6D*	72
K2SX/1	1518	UO5OA*	260	UA6-150-1367*	4224
WA1PFC	8	YL2EC*	72	UA0-098-134	2132
VE3HX*	540	YU7SF*	242	UB5-073-1610*	12342
		YU7KM	162	UB4-060-175	1440
Europe:					
DL6YK*	1320	**Africa:**		**SWL CW:**	
DJ4SO	1160	7Q7XX*	18	UA6-150-1367*	828
DJ5GG	912			UA0-098-134	336
DL8UCC	630	**Asia:**			
DL3RD	408	HL5AP*	928		
Y21PE	420	JH3LCU*	8556		
Y21TO	126	JK1AJX/1	7912		
DL6UEG	84	7M1GAG	3640		

**PO Box 300 Caulfield South VIC 3162*

BT

Divisional Notes

Forward Bias — News from the VK1 Division

Christopher Davis VK1DO

Recent broadcasts have included some timely reminders of forthcoming events, some of which fall early in the new year. The John Moyle contest has attracted some excellent early planning and I am sure this preparedness will pay dividends.

Earlier still, in the new year, and equally important, is the matter of our Division's AGM. You might feel that November is an excessive amount of advance notice for an event which takes place in February. My experience is that three months is a minimal amount of notice to adequately stimulate planning and consultation between members and the existing committee. I am confident that more people will seriously consider standing if they are not put on the spot in the weeks immediately prior to the AGM.

If you would consider a position on our committee, but are uncertain of what is involved in terms of time and responsibility, please speak directly with an existing committee member. You will be pleasantly surprised as to how reasonable the expectations are and just how readily a new committee member has settled in with no previous experience.

I hope that all members have repaired relations with their respective spouses after the vast new acquisitions that took place at our October meeting during the trash and treasure. I hope that some of the plans that were heard being espoused come to fruition. There should be numerous amateurs head down and tail up with soldering iron in hand.

You might have gathered that repeat broadcasts of our Monday night transmissions have ceased. These Wednesday night repeats were involving a considerable effort in recording the original, transporting the tape, organising volunteers for running the repeat, etc. No doubt, now that we have discontinued the service, there will be generous claims by those who thought it was of earth shattering importance and how readily they are able to step in and run it.

Unfortunately, a lot of this rhetoric misses a few fundamental points. The broadcast can be readily tape recorded by the individuals who know in advance that they are going to miss it, or might miss it. Just a Kambrook power timer and a cheap deck will do the trick. Or, alternatively, organise a friend to do it for you. Furthermore, the degree of advance notice and repeated content within the broadcast assures the listener who misses one week of some degree of overlap later.

One final reminder regarding our November 22nd Xmas party. This will take the form of a bring your own everything BBQ at Weston Park peninsula in Yarralumla. Listen for talk in directions on channel 146.500 MHz FM. Weston Park is the continuation of Banks Street in Yarralumla.

Our last examination in all subject areas will take place on the 28th of November at the Hughes Community Centre in Wisdom Street in Hughes. For further details and application forms, please telephone Jan Burrel, VK1BR on 291 7123. The close off date for this exam is Friday November the 12th

I hope you will make the effort to bring the whole family for our XMAS party and I look forward to seeing you there.

VK3 Notes

Barry Wilton VK3XV

New Service for Members

WIA Victoria is now able to offer credit card facilities to members. The office is able to accept VISA, BANKCARD and MASTERCARD for all purchases over $10.00, including telephone and mail order.

It should be noted that membership subscriptions must be paid directly to the WIA Federal Office.

1994 Classes

WIA Victoria will be conducting a Novice class in 1994 on Tuesday evenings at Camberwell Grammar School. Instruction is available in both Morse code and theory, and examinations will be conducted "in house" at the completion of the 24 week course.

The course commences in February 1994 and a brochure containing full detail is available by telephoning or writing to the WIA Victoria office. WIA membership will be available to students at a specially discounted rate for the first year's subscription.

Please recommend our course to your friends as it is one of the best available in Victoria.

1994 Membership Subscription

The 1992 Annual General Meeting authorised a $6.00 increase in the Divisional component of the subscription. This increase was not implemented in 1993 due to the Council decision to postpone same for 12 months.

Cost savings in a number of areas, coupled with improved efficiency and profits from trading will enable a further postponement of any increase.

THE 1994 SUBSCRIPTION FOR ALL GRADES OF MEMBERSHIP WILL REMAIN UNCHANGED.

QSL Bureau

The QSL Bureau is operating very efficiently. However, there has been some fall off in the number of cards being processed owing to the decline in propagation.

The QSL Bureaux are operated as a free service to members and constitutes a major expenditure item of members funds. Currently the Bureau handles outgoing cards for no charge to members, and at a cost of 10c per card for non members. The Inwards Bureau is a free service to members and non members are required to pay $3.00 per month to use the service.

As from February 1st 1994 the QSL Bureau will provide services for members only, and non members' cards will be held at the office for collection for a period of 6 months.

5/8 Wave — VK5 Notes

Rowland Bruce VK5OU

I didn't attend the September Council meeting due to a missed plane connection. As it happened (see later), perhaps I was fortunate. It must have been a pleasure, though, for members to approve eight membership applications. Welcome to:

J Bugno	VK5CJC
S Birkin	
O Szemis	VK5ADX
G Bridgland	VK5NDZ
G Bruecher	
P Maumill	
D Bramich	VK8XDB
R O'Brian	VK5ZOB

By now JOTA and "Leisure Day in the Park" will have been and gone. From the plans being made I feel confident that all will have gone well. Another opportunity presents itself shortly for us amateurs to get out and about. Camp Quality is not that far away. Please make arrangements with John McKellar VK5BJM, if you can lend a hand.

The Council agreed that the Divisional component of membership fees remain the same for the forthcoming year. I'm sure this will be greeted with relief. Also welcome, perhaps, is the decision to have a clubs convention once again. It is planned for 25th to 27th February at Douglas Scrub, the Guide campsite.

I was one of the examiners recently at the BGB. It looks as though there will be some new callsigns around soon. Those who were not successful, by and large, came within a cat's whisker (remember those things?) of passing. I hope they do not feel discouraged and will sit the next set of questions.

Christmas is fast approaching! So is the annual social evening. I'm not sure of the exact date, but believe it is likely to be earlier than usual. Keep an ear out for the date, and try to be there. If it follows the pattern of previous years we can expect a good evening's entertainment and fellowship.

Fellowship was certainly not in the air at the September Council meeting. About midnight the members were startled by a loud crash and looking out the window they could see evidence of a road accident outside in West Thebarton Road, but by the time they arrived on the scene the driver of an allegedly stolen car had disappeared on foot down the road. This vehicle had rammed Secretary Maurie's car, causing it to cannon into President Bob's and writing it off. The things some people suffer for amateur radio.

Talking of Maurie, have you seen the Journal lately? A great effort. Where does the time come from? Perhaps members and non-members, if they have an item to contribute to this column, or to the Journal, could submit it to Box 1234, GPO Adelaide 5000. Both of us would welcome extra material.

QRM from VK7

Frank Moore VK7ZMF

Council meeting 11th September 1993

A very productive meeting was held in Launceston with all divisional council members attending except our treasurer who is away working on the mainland. It was also pleasing to see a large contingent of visitors.

Special Event Station

A special event station is to be run to celebrate the commission of the Tasmanian Government's new ship the "PETER PAN" which is to replace the "ABEL TASMAN". The ABEL TASMAN is our main ferry and link across the Bass Strait and has served us well over the last eight years but the new ship will be much larger and quicker. Details of the special event station are not available at this stage as this is a new idea but it is proposed to run a station from the ship on its first crossing and then carry on from various locations around Tasmania. QSL cards and awards will be available. Details to be published and will follow as soon as they come to hand.

Central Highlands Hamfest

A hamfest is to be held at the Great Lake, Central Highlands. This event is now looking as if it will go ahead as the expressions of interest are starting to arrive. The proposed time is March 1994.

A few details. The venue is at Miena on the Great lake which is in the centre of the famous highland trout fishing area. It is also the centre of Tasmania making it very accessible from anywhere on the island.

There is plenty of accommodation at reasonable rates right at the venue. Trade tables from Yaesu, Icom, Kenwood, George Harvey, etc.

Also workshops from various amateurs and other organisations. Should be a great event so let us know if you would like to come. Contact Peter Clark VK7PC in the north or Bill Reid VK7JWR in the south for more details.

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Education Notes

*Brenda Edmonds VK3KT **

There has been discussion recently about the lack of resources for students, instructors, and newly licensed operators.

One statistic which has never been recorded is the proportion of examination candidates who have attended some sort of training course, or have prior qualifications in electronics-related fields, as against those who try to achieve their licences by self study. This would, of course, be hard to assess as many of the "self taught" do indeed have assistance from friends and colleagues. In any case, though, it is pretty hard work trying to gain a licence without a formal support system to guide, direct and answer questions.

The resources available are mostly those from sister societies such as the ARRL and the RSGB, rather than local productions. I know of only about five texts or manuals produced in Australia over the last ten years, and not one of those can be recommended as "all you will need" to a beginner. Admittedly, the principles of transmitters and antennas do not vary and I would never recommend that a beginner rely on only one text, but there are times when an Australian publication would be of more use than an overseas one.

So what do we need, and who should do something about it? Should there be a Teacher's Guide as well as a student text? Which should have the higher priority? Is there a need for a "Guide to the Newly Licensed Operator"? In the past, the new licensee generally began operating under the watchful eye of the older amateur who had inspired and coached him (nearly always him), but that tradition seems to be dying.

I have been asked many times for a correspondence course for the Novice licence, and have passed on that request, but so far I have not heard of one that is working. I have also been asked for a course on audio tape for the sight-impaired or for students such as drivers who could listen while driving. I would like to see a complete course available on videotape on a non-profit basis, and an "Ask the Expert" service to which the remote students could send their problems for discussion.

Any readers who have views on the provision of such resources are welcome to contact me. Your comments on needs and priorities will be welcome. If you have materials to share with the wider community, I will be pleased to review or publicise them.

In the meantime I am keeping busy with the review and extension of the Theory Examination question banks. It is hoped to have this completed about the end of the year. If the banks are then published, they should become a significant resource for both teachers and candidates. I also have a partly completed Study Guide for the AOCP level. If any readers wish to have input into that, I would be pleased to send a copy for comments. There is still a lot to be done but time and energy are both scarce. The physical resources which the WIA can provide are limited, but some of its major resources are the knowledge, skill and enthusiasm of its members.

**WIA Federal Education Co-ordinator*
PO Box 445, Blackburn, 3130

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Don't buy stolen equipment — check the serial number against the WIA stolen equipment register first

How's DX

*Stephen Pall VK2PS**

To compile this column, I use three sources of news. I am spending at least a couple of hours almost every day on the bands, listening mostly and transmitting occasionally. I receive three DX Bulletins each week. One of these bulletins is funded by a well known DX-er, located between Sydney and Perth, for which generous gesture I am thankful. The third source of my news is the readers of this column who supply me with band reports, interesting QSO news, QSL information and occasionally with some DX news. The difficult task is to decide what is newsworthy by the time you read this column. The leadup time and deadline with our monthly magazine on the average is four to five weeks. (I am writing this on the 30th of September to appear in the November issue). My aim is to give you the most up-to-date information of future DX activity which is still current and on the bands when you eventually read the column. I think, it would damage the credibility of this column if, as an example, I had told you in the October issue to look out for Baldur, active in Nepal as 9N1BD, when that activity ceased on the 7th of September.

However, if you feel that I should report on past DX activities (provided the Editors are able to find me more space) I will be glad to do so. Send me a short note to guide me about your feelings and requirements. I must also note that lately I am receiving less and less reports from my regular contributors. Don't tell me, you gave up DX-ing because propagation is not the best? I need your support! I need your report which should reach me around the 20th of each month. You, the reader deserve an up-to-date newsworthy column and with your assistance I will be able to continue to produce one.

Mellish Reef VK9MM

At the time of writing this the Mellish Reef DXpedition is on the high seas, returning to Queensland. Having worked them in different modes on a variety of bands, and having heard the favourable comments from both VK and overseas stations, the activity on Mellish was a huge success.

Mellish was at the 26th place in the list of "most wanted countries" before this activity. The members of the expedition can be proud of their achievements because they reduced substantially the demand for this very rare DX country.

I heard Bill VK4CRR first as maritime mobile on the 17th of September when they were still 147 nautical miles away from the reef, under motor, against headwinds, with a speed of 8 knots.

Next day, they were pounding away on 7 MHz with a high speed CW transmission. The 18th September on 7 MHz at around 1400 UTC was the DXers' CW paradise. Not only Mellish was active, but at the same time there was VS6WV, HZ1AB, T30NA, BV7FC and others, all right next to each other. Within a few days the Mellish group gradually extended their activity to ten bands on CW, SSB, RTTY and the occasional 6 metre contact. There is no doubt they were well equipped. Five Yaesu HF stations, amplifiers, a variety of Yagi, vertical and wire antennas did the trick. Propagation was generally good from VK, however, some difficulty was experienced on 21 and 28 MHz. The "chit-chat" SSB group on 160 metres was quite surprised one day when they found themselves on the same frequency with VK9MM which had a good, strong signal in the eastern VK states.

On the 22nd of September they had 20,000 QSOs in the bag but the number was increased two days later to 33,000. They finished up eventually with about 44,565 contacts.

On the 25th of September the weather, which was perfect until then, had changed. The seas were high, the 63 foot (19 metre) yacht "Nina Q1" had to move half a mile offshore out into the sea to avoid being swept on to the reef. Rain started to fall, driven by the wind. This was not pleasant on a speck of sand which is about 300 by 60 metres and on average is only about 2 metres above sea level.

The VK novices had the opportunity to contact Mellish on Sunday evening the 26th of September (local time) on 3600 kHz. Later VK9MM moved on into the "DX window" of the 80 metre band.

In the meantime the rain and the wind continued lashing the reef. It was time to pack up and go. The expedition left the reef two days earlier than planned originally. After four days of sea travel, which upset many a stomach of the expeditioners, they landed on the 30th of September at the Kingfisher resort of Fraser Island where they stayed overnight. On the first of October they landed on the Queensland mainland about 100 km north-east of Gympie at Tin Can Bay.

My commiseration to those DXers who needed Mellish but were unable to work it. Now you have to wait at least five to seven years before another group will tackle that particular sandbar in the Coral Sea, some 600 miles due east from Townsville, with the coordinates of 17°24'39" S and 155°53'25" E, and also known among island chasers as IOTA OC-072. QSLing will start on the 1st of December and the QSL manager is VK4CRR Bill Horner, 26 Iron St, Gympie, Queensland, 4570, Australia. Do not forget to include a SASE (VK) or reply envelope with IRC or one "green" stamp (overseas).

Pratas Island BV9

By the time you read this, the proposed Dxpedition to this island (see August and October issues of *Amateur Radio* magazine) has probably taken place, as it was scheduled to start on the 6th of October. Pratas has been mentioned as a possible DX country before. It lies at least 234 statute miles in distance from Taiwan which country claims sovereignty over the island. Intended operation time of the expedition is about 10 days. The latest information, dated the 20th of September, gave the callsigns of the prospective operators for the station BV0ARL/BV9 as BV5AF, BV5AG, BV40B, BV5CR, BV2FB, BV2VA, BV4BL, BV4CL, BV4TC, and BV2WC, plus K7JA, N4VA, OH2BH (Martii), and OH6DO. The operators" credentials were all checked by the Taiwan Defence Department. Operation is to be on 6, 10, 15, 20, and 40 metres.

Peter I Island DXpedition

Planning of this expedition is progressing according to plan (see June and October issues of *Amateur Radio*). The group will sail from Port Stanley (Falklands) on the 23rd of January 1994 aboard a Russian 18,000 ton ice-breaker now fitted to carry 100 passengers and two, seven passenger helicopters. The ship on its voyage to Peter I Island will sail south into the Drake passage towards the Antarctic Peninsula, where various landings will take place for the benefit of the other passengers. The ship will reach Peter I Island on approximately the 1st of February. The expedition will land by helicopter. The necessary equipment is being assembled now, from tripods, which will hold the 40 foot telescopic masts, to a great number of antennas, among them the GAP vertical antenna which proved itself on Mellish Reef. They have two 4 kW Generators but need more power and they plan to have 800 gallons of fuel available. The budget of the expedition is $US200,000, and they plan for 70,000 to 90,000 QSOs in 16 to 17 days. Contributions are urgently needed. Please send your donations to AA6BB, Jerry Branson, 93787 Dorsey Lane, Junction City, OR 97448, USA.

From Wales to Wahroonga — VK2WAH

This was a special event station commemorating the 75th anniversary of the first direct wireless message from the United Kingdom to Australia. The wireless message from Wales was sent by Marconi, for the then Australian Prime Minister Billy Hughes who was visiting his birthplace in Wales at that time. The event took place on the 22nd of September 1918 and the signals were received at Wahroonga, a suburb of Sydney 20 km north from the city centre, by Ernest Fisk in a receiving station attached to his private home. Fisk was the Managing Director of Amalgamated Wireless (Australasia) Limited, known today as AWA Ltd. AWA was the pioneer of commercial manufacturing of radios and communication equipment and has been manufacturing ever since that time.

In September 1993 amateur radio operators from Wahroonga and nearby areas formed a new group, the Wahroonga Amateur Historical Radio Association (WAHRA) which operated the special event station VK2WAH. On the 22nd of September a special ceremony was held at the Monument, commemorating the sending of the first message, which was attended by hundreds of school children, local dignitaries, historians, the press, a great number of radio amateurs, eleven surviving members of the Fisk family, and the son of Charles Maclurcan (former VK2CM), an amateur pioneer between the two world wars.

VK2WAH was in operation for only 24 hours. Eight operators were active on nine bands with a total of 134 contacts in CW, SSB and FM modes. Poor propagation limited the number of contacts but, despite this, 16 countries and 40 prefixes were worked. The event was celebrated also in Wales, UK. The Dragon Amateur Radio Club of North Wales was activating the special event station GB2VK on the same day from the site at old Caernarfon (Carnarvon, now known as Waunfawr) the site of the old Marconi station. The re-enactment of the original contact was made on the 22nd of September 1993 on 14051 kHz at 0728 UTC, naturally in the cw mode. The ceremony at the Wales site was attended by the BBC, the local MP and other dignitaries. The Wahroonga monument was erected in 1935 and is located at the corner of Stuart and Cleveland Street. If you are around that part of the world, have a look at it. The Wahroonga Amateur Historical Radio Association plans to activate VK2WAH each year on the 22nd of September. An attractive commemorative QSL card will be sent in reply to QSLs received. Send your card with SASE to WAHRA, PO Box 600, Wahroonga, NSW, 2076, Australia. The Dragon Amateur Radio Club can be contacted at 23, Lon Hedydd, Llanfairpwll, Gwynedd, North Wales, LL61 5JY, Wales, UK.

Brunei — V85BJ

It is not often that one can have a long chat with a DX station in a pile-up in a much sought after DX land. It was therefore a pleasant surprise when Barbara called me, not on the air but on the landline in Sydney, for some information. The call, which probably was intended for a few minutes, ended half an hour later. The O'Connors, Barbara V85BJ and Brian V85EB, were on their annual holiday in their home town. Here is a micro-picture of their lives in Brunei. Brian is an electronic engineer employed by an oil company. They live about 100 km south-east from the Capital of Brunei, Bandar Seri Begawan. Brian has been there for three years and Barbara, with their two young girls, joined later. The children attend a local company school which is based on the English school system. Barbara used the WIA correspondence course to prepare herself for the exam which she passed in all three sections in one night. Her home call is VK2GTX and her reciprocal Brunei licence is 10 months old. Whilst Barbara is quite happy to be on the SSB section of the band, Brian is busy with the digital (packet) mode of communications. Barbara so far has made about 4000 QSOs which number will certainly grow by the time they leave Brunei in the middle of 1994. The equipment is a TS440S and a 3 element tri-band antenna at a height of 10 metres. The antenna is "inspected" from time to time by the local monkeys living in the area, which causes some SWR. Brunei is two hours behind Sydney time and the temperature is usually between 30 and 38 degrees. QSLs with SASE to B.O'Connor, PO Box 62, Northbridge, NSW 2063, Australia.

Future DX Activity

- Rumour has it that 9U5D will be on the bands from Burundi, activated by Belgian operators.
- Sanyi XU7VK will stay in Cambodia until July 1995. QSL to HA0HW
- Mayotte resident, Elio FH5CB, can be heard from time to time on 14195 around 0530 UTC. QSL to callbook address.
- XU1AG is active and has a new QSL manager, N7QCN.
- Bob W5KNE, editor of "QRZ DX", will be on Christmas Island (Indian Ocean) from Nov 27th to December 15th with the callsign VK9XN.
- Listen out for 3V8W. He is Karl DK2WV who plans to operate from Tunisia around Christmas time.
- There is a new operator in Equatorial Africa. Don arrived around the end of September and is expected to sign also as 3C1TR, the callsign used by his predecessor. QSL to K8JP.
- Rob is in Somalia signing T5/N3HQW and is operating on 14, 18 and 21 MHz in his local afternoon and evening time. QSL to WD4NGB.
- Keep a look-out for Jari OH3MIG/4U who will be active from the Golan Heights until December. He prefers CW. QSL to OH3GZ.

Barbara V85BJ

- If you need Wallis Island try to find Jose FW1DJ on 14115 kHz around 0430 UTC.
- ZD8M on Ascension Island is active on all bands/modes until March 1994. QSL to G3UOF.
- It was reported that Detlef OE3DKS will be active as XT2DK until April 1954. QSL to Dr Detlef Kroker, PO Box 2937, Bobo-Dioulasso M, Burkina Faso, Africa.

Interesting QSOs and QSL Information

- A41KJ — Siddiq — 14226 — SSB — 1217 — Sept. QSL to N5FTR William M Loeschman, 717 Milton, Angleton, TX 77515, USA.
- 7Z2AB — Dave — 14247 — SSB — 0525 — Sept. QSL to AA0BC Dana M.Howard, Rt 1, Box 614 Holt, MO 64048 USA.
- ZK3DM — Marcel — 14247 — SSB — 0350 — Sept. QSL to ON4QM Marcel Dehonin, Everestraat 130, B 1940, Sint Stevens Woluwe, BT, Belgium.
- AH6DR/KH7 — Gus — 14247 — SSB — 0642 — Sept. QSL to KH6JEB Richard I Senones, 95-161, Kauo Pae Place, Mililani Town, HI 96789 USA.
- 7Q7RM — Ron — 14226 — SSB — 1147 — Sept. QSL to G0IAS A R Hickman, Conifers, High St, Eckelsley, Retford, Nottingham, Notts, DN22 8AJ.
- C21/KC6DX — Yugi — 14247 — SSB — 0456 — Sept. QSL to JA2NVY Makoto Inagati, 5521, Hirakuchi, Hamakita 434 Japan.
- AH6ML/NH9 — Kirk — 3795 — SSB — 1152 — Sept. QSL to Oklahoma DX Association — Box 88 — Wellston, OK 74881 USA.
- 6K93XPO — 21020 — CW — 0620 — Sept. QSL to the Korean QSL Bureau.
- A71BH — Mohammed — 14251 — SSB — 0513 — Sept. QSL to OE6EEG, Dr Selim El-Rifai, PO, Box 31, A-8011, Graz, Austria.
- 5WIGC — Cliff — 10106 — CW — 0713 — Sept. QSL to Box 1117, Apia, Western Samoa, Central Pacific.

From Here There and Everywhere

- The planned activity of Bing VK2BCH on Lord Howe Island, beginning 18th Sept, has been cancelled. Bing phoned me after last month's closing time and advised that his health did not improve, so unfortunately he was not able to go to Lord Howe Island.
- Jim VK1FF, ex-WB2FFY says that after four months in VK he is yet to receive a VK2 QSL card. I sent my reply card direct to him. C'mon fellows, who owes him a card?
- Last month I mentioned the "160 metre Band" propagation experiment between the West Coast of the North American continent and the east coast of Australia. Roger VK4YB, one of the participants, sent me a short note about the "Seance" net (South East Australia to North America Communications Exchange) which operated from 14th of May to 13th of August. There were 646 VK/ZL check-ins and 250 DX check-ins, mostly W, VE, P29, FK8, V85, KH2, KL7 and UA0 stations. Next year activity will be from the 13th May to 12th August.
- The Council of Europe Radio Amateur Club DXpedition to San Marino T71, has produced a handsome card with a detailed map of Europe as the main feature. The Republic of San Marino has been a member of the Council since 1988.
- If you worked EX0A/EP, EX0M/EP, or 9D8UM, then send your QSL to DF8WS.
- Just heard a Sydney amateur closing his CW QSO saying to his German QSO partner "73 Fm Sydney the Olympic city". Nice touch.
- It appears that the recent operation of Karl DK2WV in Tunisia as 3V8W was a genuine one. Carl says he had a valid licence and documentation was sent to the DXCC. He made 6500 contacts on CW.
- The DX Advisory Committee (DXAC) of the ARRL recommended the reinstatement of Eritrea to the DXCC Countries list as from 24th May 1991.
- If you worked Roger in October on the CW bands from Tristan da Cunha with the callsign ZD9SXW, send your QSL card to G3SXW Roger Western, 7 Field Close, Chessington, Surrey KT9 2QD, England, or via the Bureau.
- VR2BH is the new callsign of Martii OH2BH. Martii is on a two year business assignment in Hong Kong.
- Atsu VK2BEX of Nauru, Willis and Mellish fame will attend the Swedish DX Convention at Karlsborg, Sweden between the 9th and 10th of October as a guest speaker.
- Monk Apollo from Mt Athos SV2ASP/A is reported to be involved in a list operation with OE6EEG on the weekends at around 1200 UTC. It was also reported that Apollo might ask for the call SY0A in 1994.
- The 1993 Seanet Convention will be held in Dhaka, Bangladesh from November 19 to 21.
- The "New York Times" and the "Dallas Morning News" reported in August that South Africa has agreed to turn over the enclave of Walvis Bay and some islands (Penguins?) to Namibia as soon as possible. The tentative date of the handover is 28th February 1994. If the news is correct, it could mean the deletion of these countries from the DXCC list.
- Visitors to Slovakia, OM, will receive OM callsign with the number "9".
- If you have worked Jim 5V7JB, the QSL address is Jim Brillhart, PB 8, Anie, Togo, Africa. Jim is a medical missionary in the African bush.
- If you are interested in island activity you can buy your 1993 IOTA directory from the RSGB IOTA Director, Roger Ballister G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey, GU24 8AR, England. Price $US12 or 18 IRCs.
- A complete new multiple beam array antenna system has been installed on Aaland Islands, the headquarters of the well known OH0W location, to provide a multidirectional coverage on all bands. OH0DX was active from this site in the recent September Scandinavian activity contest.
- Talking about contests the CQWW SSB Contest will be held on October 30-31 and the CQWW CW Contest will take place on November 27 & 28.
- If you need Ethiopia you have to stay up late (1500 UTC) and try your luck on the 14243 net. Pierre, ET3RP (F6GZA) joins the net from time to time.
- It might interest you to know that Australia Post closed its internal telegram service on 1st October 1993. The development of new technology, the spread of telephone services and fax machines has made the once flourishing telegram business redundant. In 1950 more than 25 million telegrams were sent each year in Australia. This current year the number of telegrams sent was less than 60,000.

QSLs Received

S52AA (4M OP), T71CE (4M MGR F6FQK), VY1FF (2M OP), VY1JA (2M OP), E35X (2M MGR LA6ZH), D2SA (2W MGR F6FNU).

Thank You

Thanks to all of you who kept me informed and assisted me in compiling these notes, especially to VK1FF, VK2BCH, VK2DSL, VK2KFU, VK4UA, VK4YB, VK5XE, VK6NE, F6FQK, V85BJ and the following publications: QRZ DX, The Dx Bulletin and the DX News Sheet.

Good DX and 73

PO Box 93 Dural NSW 2158

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International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch

*Gordon Loveday VK4KAL**

The International Amateur Radio Union Monitoring System (IARUMS) is set up to record, report, and encourage the removal of non-amateur stations from amateur band allocations. Stations targeted are usually broadcast or commercial stations from other countries. Priority is not given to local "pirates". Each country appoints a Co-ordinator, who is responsible for collating reports and forwarding them to the appropriate regulatory authorities (the Spectrum Management Agency in Australia).

Each WIA Division, apart from VK3, has a Divisional Co-ordinator to collect reports from that Division and forward them to the Federal Intruder Watch Co-ordinator. But the main strength of the service is in the individual amateurs who spend time regularly listening on the bands and identifying types of signals and stations.

More Intruder Watch listeners are always required. Volunteers who contact either their Divisional Co-ordinators or me direct will be supplied with information, log sheets and tapes to assist in identifying modes.

Below is a recently logged list of intruders into the amateur bands:-

September Summary 1993

FREQ	UTC	DATE	MODE	COMMENTS	X
3542	2100	230893	J3E	JA fisherfolk	4
3570	1030	0909	J3E	As above	
3620	1220	1008	A3J	B/C stn Jakarta, M.Indo	
7000	H24	0209	J3E/U	Indonesian n/amateur	53
7001	1320	0209	J3E/U	2 way n/amateur Indon	
7002	1136	050993	A1A	V Beacon	8
7005	1128	0109	J3E/U	2 way tfc n/amateur Indo	31
7010	1109	0809	J3E/U	non amateur	
7012.5	1148	1609	A3E	Wx fax 120 rpm	
7014	1140	3108	R7B	2.5 kHz wide	8
7015	1008	090993	R7B	Has timing pulse	10
7015	1128	0809	J3E/U	N/amateur Indon	6
7020	1158>	0409	NON	Runs for hours, no ID	9
7020	1015	0909	F1A	Odd grps ltrs/figs CIS	
7039.5	1110	2408	A1A	F Beacon	26
7053.5	1120	290893	R7B	2.3 kHz w/also on 7056	10
7060	1058	1409	—	"Whistler"	
7070.5	1204	0409	A3C	Wx fax 120 rpm no ID	
10115	2135	dly	A3C	as above	30
10125	0545	2608	J3E/U	F voice, id "C102"	
10147/50	0710	150993	J3E/U	Asian CB ???	
14061+/–	H24	DAILY	F7B/A1A	Data bursts China	31
14095.5	0730	1509	A1A	Calling NQF de LPC K	
14170.5	MNY	daily	F1B	Moscow Naval, 250 Hz CIS	7
14210	1100	2808	A3E	2 F/7105, B/c stn China?	17
14217.5	0745	0809	F1B/A1A	UMS chain 250 Hz CIS	
14279.5	0830	150993	A1A	PKJ	
14285+/–	0200>	Daily	A1A	VRQ msgs + tfc VTN	30
14338	0040	daily	A3C	Wx fax 120 rpm	30
18090	0635	1209	A3E	B/c stn mid east, music	
18115	0216	1209	A3E	B/c mid east Arabic??	
18135	1102	0409	A3E	B/c non, sum modulation	
18138	0154	110993	F2B	Piccolo/hrd 18127/30	
21031.5	mny	14/2909	F1B/A1A	Calls UU UMS CIS	37
21114	0550	MNY	A1A	ID P7A	12
21283/5	0500	mny	F1B/NON	No idents	18
21305	1008	0909	A3E	B/c id "All India radio"	
21314	0535	mny	A2A/NON	Ruf cw sp variations	

Stn VVH operates this freq, among many others, 21118 to 21371, same mode
Further checks needed.

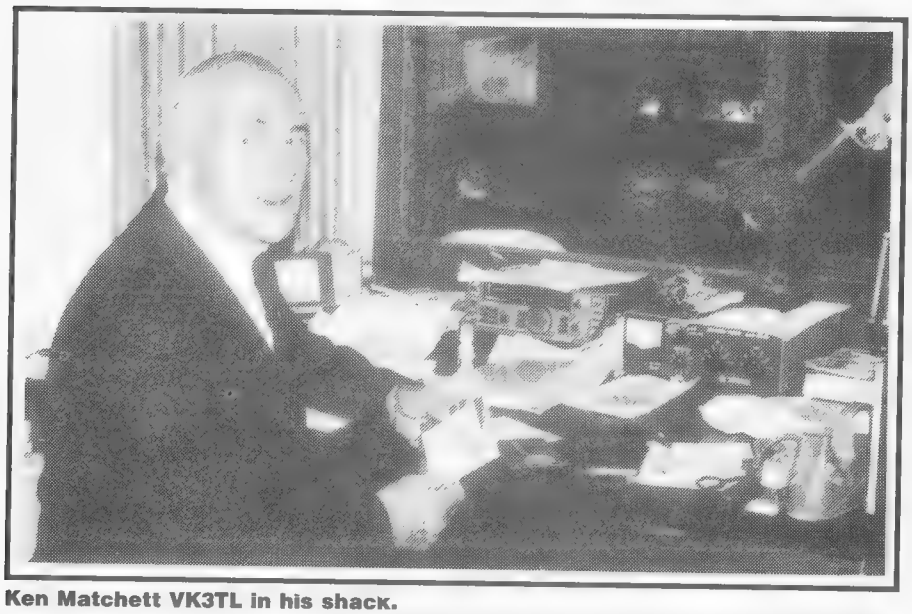
24896 0031 050993 A1A 2 F/12448, Marine tfc
24953]
24963] All Military B/cast stns possibly from ASIA.
24970]

My thanks to VK's 2GS; 4BG; 4AGL; 4AKX; 4BTW; 4BXC; 4DDJ; 6JQ; 6RO; 6XW & 6BWI.

**Federal Intruder Watch Co-Ordinator, Freepost No 4 Rubyvale QLD 4702 or VK4KAL@VK4UN-1*

QSLs from the WIA Collection

Ken Matchett VK3TL Honorary Curator WIA QSL Collection*



Ken Matchett VK3TL in his shack.

Corsica — A struggle for Freedom

Corsica is the fourth largest island in the Mediterranean after Sicily, Sardinia and Cyprus, but it is still rather small, being 184 km long and 83 km wide — about an eighth of the area of Tasmania. Approximately three quarters of this island of bare peaks, cliffs and sandy beaches is covered by forests or by the famous *maquis,* a sweet smelling flowering shrub. The word itself is interesting. Corsicans being a proud people frequently were engaged in freedom fighting: Instead of saying that these men were outlaws it was said that they "had gone off into the maquis", which name had become used to include undergrowth in general. When World War 2 broke out the term "maquis" was used as a synonym for members of the underground French Resistance.

Due to its position in the Mediterranean, the island has been subject to numerous invasions including those of the Greeks, Romans, Vandals, Italians, Spaniards and finally the French. The Corsicans were even warred against by the Saracens, the Arab followers of Mohammed, until the Pope in 1077 handed the island over to the Bishop of Pisa. It is interesting to note that the English played a part in Corsican history. The Corsican parliament at the end of the eighteenth century (just a few years after Capt Cook's discovery of the east coast of Australia) requested help from the British in the island's struggle against the French. It was during this struggle that a young Capt Horatio Nelson, later to become Lord Nelson, the greatest of British admirals, lost his eye by fire from a Corsican gun. In 1794 the island became part of the British Empire but the situation lasted for only two years. Britain renounced her claim to the island under pressure from both the Corsicans and the French.

F8NE

When call-sign prefixes, as we now know them, were first assigned at the close of the 1920s, the prefix F was allocated to France and its colonies. During the early years of the 1930s certain of France's colonies were assigned special prefixes, the first of these Indochina (Fi), soon to be followed by Tunis and Algeria. It was not until 1937 that the magazine "Radio" listed Corsica as a separate "country" to France. However, no prefix was suggested. Between that year and the start of the war numerous French possessions were allocated identifying prefixes but there was none given to Corsica. The "Post-war Countries List", the official list for ARRL DX contest and the Post-war DXCC, published in QST in February 1947, again listed Corsica without prefix.

Immediately after World War 2 the forces of occupation were issued with the so-called XA calls. Forces on Corsica were given the station call XAAX according to the list of calls appearing in the RSGB Bulletin of December 1945. Early post-war Corsican QSLs like the one shown, F8NE, simply showed the F prefix. This particular card is dated June 1948, the QTH being Ajaccio, the capital city and the birthplace of Napoleon. It was sent to well known DXer Paul Caboche 3B8AD (then VQ8AD) on Mauritius. During the period when FC was being listed as an unofficial prefix (as early as March 1949) Corsican stations used the F prefix followed by "dash FC" eg F9VN/FC (this station in 1972 changed its call to FC9VN).

Jean PERIQUOI, 27, Cours Napoléon, AJACCIO (Corse)
RADIO VQ8AD QSO le 19/6/48 à 1625 TMG
F8NE
REF.
Ur 14 Mc/s Fone Cw RST 458 Modul QRM
Rx Super 18 tubes Tx 6V6-6L6 25W Ant Herz
Remarques PSE QSL avec la carte Tnx QSO. 73 & DX
PSE QSL direct ou via REF, 6 Rue du Pont-de-Lodi — PARIS 6

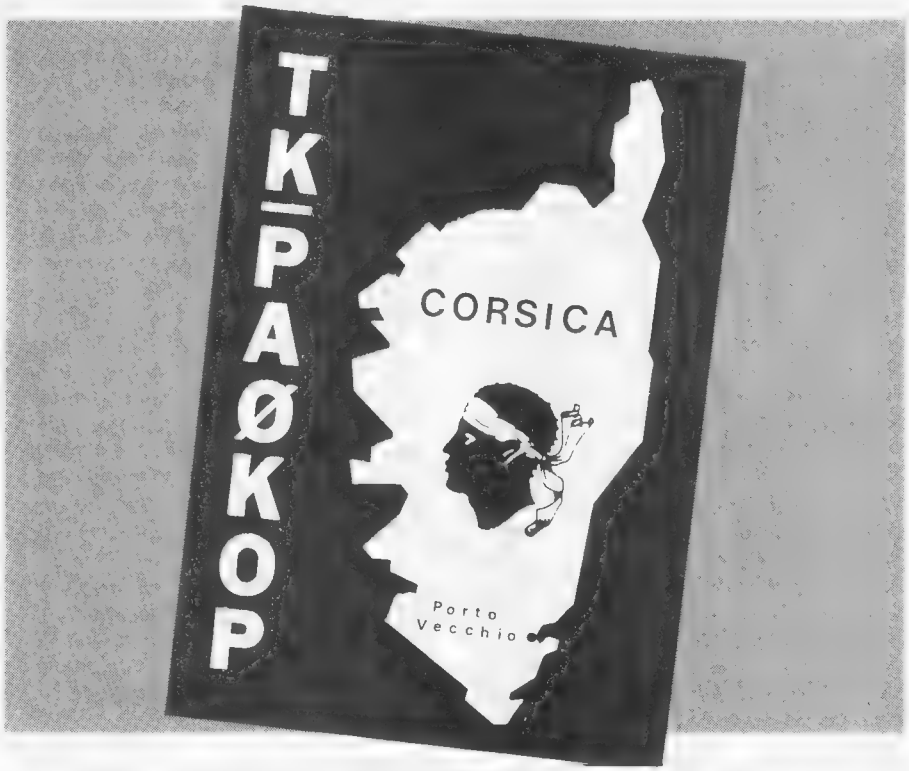
FØWV

The zero numerical prefix has frequently been allocated to portable stations, eg FC0FHK, a DXpedition by German operators in 1979, and FC0GAG in 1982 by Italian hams. Similarly, it seems that the F zero prefix was allocated for earlier portable operations. The QSL shown, F0WV, dated June 1971 was given to the Belgian Air Force amateur radio club as members of a DXpedition to the island. Of late the TK zero prefix is again of special significance, being the prefix allocated to radio clubs on the island.

TK/PA0KOP

By 1985 the prefix TK (from the new ITU allocation TKA-TKZ for France) had replaced the FC prefix. Holders of FC calls changed to TK with little or no change to the suffixes of their calls. For example, station FC9VN took the call TK5VN and FC6IDG changed to TK4ID. It is to be noted that France itself had previously used the TK prefix, albeit for special occasions. For example, TK9ITU was one of a series of TK calls issued for the World Telecommunication Year of 1979. The QSL shown, TK/PA0KOP, was from a Dutch amateur operating portable from the island and is dated May 1989. The card shows an outline of the Island and the position of the QTH, Porto Vecchio. Readers may wonder at the significance of the head band and the dark skinned face. It represents a Moor's head and was a symbol of slavery since most of the slaves of the time were Moors. The Corsicans who had fought the Saracens later adopted it for themselves to represent their own struggle for freedom.

During World War 2 Corsica came under both German and Italian occupation, Corsicans giving their support to the French Resistance under General de Gaulle. The conquest of Corsica by the Allied forces was a strategic blow against the German position in Italy. Although not independent from France, that country has granted Corsica special rights and privileges. Since the beginning of the century many Corsicans have emigrated to France due to economic hardship, several returning to the country of their birth in old age. Some attempt has been made to provide work for the inhabitants and tourism is becoming increasingly developed. There are frequent air services from France with connection flights from Britain. Also offered are ferry services from Marseilles, Toulon and Nice to the island.



Author's Note

Would you, as a reader of this series of articles on the story behind QSLs, like to add to the WIA QSL collection? Although special event and commemorative prefixes are most in demand we welcome any QSL as a donation. We also wish to build up our collection of VK and DXCC QSLs as well as IOTA and USACA numbers. Please contact the author about parcel post and letter costs. Help from DX enthusiasts would particularly be appreciated. Radio club secretaries should note that displays of QSL cards are available on request.

Thanks

The WIA would like to thank the following for their kind contribution.

Supplementary List:-

Jerry VK7DQ — Max VK3NZO
Stan VK3SE — Mike VK6HD
Tom VK5TL — Austin VK5WO
Mike VK7ME — Tom VK3AGH
Chris VK4ABM — Don VK4DC (as VK9NC & YJ8NGR)
Mick VK4AMB — Robin VK6LK
Jim VK9NS (Norfolk Island)

Also the family and friends of the following "Silent Keys". Supplementary List:-

Basil Rogers VK3ABJ (courtesy of Ted VK3ZKP)
Alan Fietz VK2QE (courtesy of Alan VK2ACN)
Mervyn Busch VK3LL
Bert Faull VK3EF

4 Sunrise Hill Rd Montrose Vic 3765
Tel 03 728 5350

Repeater Link

*Will McGhie VK6UU **

Recent communication with Rob VK2MT, resulted in discussing a simplex gateway on 10 metres to a 70 cm repeater. The idea is not new but somewhat so in Australia. The Melbourne 10 metre repeater VK3RHF has a connection to a UHF 70 cm repeater which is similar but not quite the same. Rather than have a 10 metre repeater with all its technical difficulties, the 10 metre side of things is a transceiver that receives on the same frequency it transmits on, but not at the same time. Put simply, the way your HF rig on 10 metres FM operates. Connecting it to a 70 cm repeater allows UHF operators access to 10 metres FM, with its interesting propagation.

When 10 metres FM is at its best it is quite stunning. The signals are of true FM quality. No noise just clean, quiet audio. Stations from many thousands of kilometres away are noise free in the shack with you. Connecting a UHF or VHF repeater to such an FM transceiver lets other amateurs who do not have 10 metre FM participate.

My suggestion to Rob was two 10 metre FM stations, one in VK6 and the other in VK2, operating identical systems with gain antennas pointing at each other. The 10 metre transceivers become the link between two UHF repeaters. A coast to coast link with the outputs on UHF.

If all capital cities had such a system with all 10 metre simplex systems on the same frequency, what interesting results might occur. Your local UHF output could provide a mix of varying stations from different locations as propagation changed on 10 metres.

The next step now that the VK2 system is in operation is to install one in VK6. Some feedback on the idea would help. Is there any other interest in placing on air a 29.290 MHz simplex to UHF repeater system? Remember a 10 metre simplex system is a lot easier than a 10 metre repeater.

The following general information was supplied by Rob VK2MT.

As from Sunday (12/9/93) our 10 metre to 70 cm "gateway" has been on the air. We are presently operating on 29.290 MHz simplex, connected to the VK2RUW (438.225) repeater at Knights Hill (situated half-way between Wollongong and Nowra) which is in turn linked to the Goulburn 70 cm repeater VK2RGN (438.325) at Mt Gray, almost 100 km away. To clarify, signals received from 8225 (Knights Hill) or the link from 8325 Goulburn, are retransmitted on 29.290 MHz. Signals received from 29.290 MHz are retransmitted on 8225 and 8325.

It is important to understand the 10 metre system is simplex. This will no doubt cause some confusion to 10 metre repeater operators. Users should think of the system as a "gateway" to a UHF repeater. Being simplex, there are no duplexer repeater problems, or desense to the 10 metre system.

> *When 10 metres FM is at its best it is quite stunning. The signals are of true FM quality. No noise just clean, quiet audio.*

Work is well under way to continue this link to VK1RGI (438.525) at Mt Ginini, servicing VK1 and much of the South East part of VK2 and into VK3. Mobile on UHF, one could drive from Sydney, south through Wollongong, Goulburn, Canberra and beyond while maintaining almost constant, uninterrupted contact for over 8 hours of travelling time. In the near future, the WIA VK2 Division Sunday broadcasts will be relayed through all these repeaters, and the VK1 broadcast fed back up the link into VK2.

VK2RUW (8225) our UHF repeater is located 200" up a TV tower fed with 7/8" LDF 5-50 heliax. The antenna is a 20" long 10 dB gain collinear and the repeater runs 25 watts through a converted ex-telecom mobile duplexer. The repeater and all the associated systems are remotely controllable via 6 DTMF latches.

The entire system also has a "talking clock" attached which announces the time on the hour and will also tell you the time with the push of DTMF number "9". All inputs, 8225, the link from Goulburn and Canberra, as well as the 10 metre system, can control the DTMF functions (knowing the pin number of course) and can trigger the time announcement.

The 10 metre gateway has had considerable experimentation and "playing" by users but as yet no "DX" contacts. This is due to no one interstate knowing of the system and the poor sun-spot cycle.

Rob also supplied these technical details about the 10 metre to 70 cm gateway.

The gateway is simplex, not duplex, receiving and transmitting on 29.290 MHz. Receiver sensitivity is excellent with the receiver noise mute based on the Philips 828 circuit. We wanted a reliable mute that would not constantly false open the 10 metre system. (After all most of the users are "fugitives" from the pager noise on the 2 metre band!). The 828 mute has proven to be very reliable and was copied directly, with the addition of a pot to control the mute hysteresis, which is set for about 2 dB.

The only problem we have frequency-wise is that the Goulburn link radio we are using has an IF on, would you believe, 29.800 MHz! This has proven to be the main problem presently running the 100 Watt PA (the link radio is a Philips 747).

Exciter output is 10 Watts and the PA output 100 Watt using an old "CB" HF amplifier. The antenna is a side-mounted dipole at 100" fed via a 1 to 1 ferrite balun and military standard RG-213. The repeater site is the main TV and FM transmitting site for the NSW south coast.

A "pseudo-tail" has been installed on the 10 metre system. When using a normal duplex repeater you can ascertain repeater access by transmitting and listening for the "tail". With a simplex system the receiver and transmitter operate on the same channel. To inform users if they can access the gateway, 2 seconds after the 10 metre receiver's mute closes, the transmitter is keyed for either 2 seconds (while QSO is taking place) or will announce the system's identification.

The ident is a "real" female voice with added reverb (for a good sound), stored in Eprom. The ident is announced with every triggering of the receiver on 29.290 MHz, but will cease when a QSO starts. The ident announcement is "This is VK2RUW, the Wollongong New South Wales 10 metre simplex gateway". A talking clock announces the local time on the hour. Pushing DTMF "9" while transmitting will also trigger the clock announcement.

When work on the gateway started, the new regulations allowing limited licensees on to 10 metres was only months away, but we're still waiting! The gateway can easily be remotely disconnected via DTMF to allow for current regulations. Once the new regulations are released this will not be a problem.

Thanks Rob for the information on the gateway system, look forward to working it soon.

PS. My hard to spell word for the month....LICENSEES...I hope this is right *(Spot on! Ed.)*

**21 Waterloo Cr Lesmurdie 6076 VK6UU @ VK6BBS*

ar

Spotlight On SWLing

Robin L Harwood VK7RH

I recently received an audience questionnaire from Radio Moscow International, asking for my opinions on their performance at the time of the political crisis in April of this year. It ironically arrived on the day when a far more serious crisis erupted in Moscow with virtual civil war breaking out between the opposing political forces.

One of the interesting queries from them was did I rely on Radio Moscow's newscasts to ascertain what was happening within Russia or did I listen to other broadcasters to find out what was happening? I don't personally recollect what my reactions were to the earlier broadcasts in April, yet I am finding out more about what is happening now on the streets of Moscow from foreign broadcasters than from Radio Moscow International. At the time I am compiling this it is still unclear who has emerged on top.

At the height of the latest Moscow crisis, I hurriedly raced to my receiver, only to find that a little furry visitor had left its calling cards behind the receiver. I had visions that it had chewed through the collection of wires and cables but fortunately it was all OK. So we have left a little titbit there to deter any further exploration. We have two canine companions and they are both in disgrace for failing to catch this small furry unwelcome pest in our house. I guess that we may have to acquire a feline companion now to do the necessary.

But to return to Radio Moscow. I note that they are making monthly alterations to their frequency schedules. For example, 7150 kHz was heard in September from about 1100 UTC with their English Service but, as from 26th of September, they shifted to another channel. For a while this frequency of 7150 was a mess. Especially when Radio Australia in Darwin came on in Vietnamese around 1230 UTC. Other monitors overseas have also noted this erratic frequency behaviour of Russian external services.

I have been doing some listening down on the top end of the medium wave allocation and have been able to hear some high powered American AM stations. These are believed to be located on the West coast and are rated at about 50 kilowatts. One station is on 1580 kHz and has a "Country and Western" format. Although there is one outlet in Arizona listed as being on this channel at 50 kilowatts, I have insufficient information to make a positive identification yet. Another American is heard on 1420 kHz also with a similar format. This is a clear channel here in Australia. Identification can be difficult as other broadcasters are weakly heard on the channel at times. The best times to observe these signals from North America is from the local sunset until about 1200 UTC. Just don't assume that because there is a 50 kilowatt listed in the WRTH, that indeed is the signal you are hearing. There will be a lot of fading and you will need a lot of patience to positively identify them.

The 70th Anniversary of the first public broadcasting station in Australia falls due on the 13th of this month. Radio 2SB in Sydney commenced on this date in 1923 and is still operational although now with the callsign of 2BL. It is the ABC flagship in Sydney. Radio 2FC commenced just three weeks later and on longwave at that. This is now 2RN Radio National. 2BL and 2FC were originally separate stations with different owners but were merged when the Australian Broadcasting Commission commenced on July 1st 1932. Happy 70th Birthday 2BL!

Well, that is all for this month. Don't forget, if you have any news, you can send it to me at 52 Connaught Crescent, West Launceston TAS 7250 or via Packet at VK7RH @ VK7BBS.

73 from Robin L. Harwood VK7RH.

Pounding Brass

*Stephen P Smith VK2SPS **

I am writing this column in September, so as to give myself a little breather over the Christmas break. Where has the year gone? Just think, 1994 is just around the corner.

I am looking forward to the Mellish Reef Expedition (VK9M) and the VK/ZL Oceania contest in October. For the CW section of the contest (9/10 October), I trust that you all pulled out your keys and put in a good showing.

This month we will look at an overview of the telegraph system within the United States of America.

The telegraph was a phenomenal improvement in communications and it radically changed society. Telegraphers were held in high regard and called "lightning slingers". Operators themselves, awed by what they were able to do, pointed to the Bible verse Job 38.35 "Canst thou send lightnings, that they may go and say unto thee, "Here we are?"" as applying to them. About a dozen competing telegraph companies were consolidated in 1856 to form Western Union, establishing a nation-wide private enterprise communications network whose effects led to far-reaching commercial and social changes. Communication that formerly took weeks could be accomplished in a matter of minutes. This was most dramatically demonstrated about 15 years after commercial telegraph service began.

In 1860, letters sent via the Pony Express (officially the Central Overland California and Pike's Peak Express Company) typically took 10 days from St Joseph, Missouri to Sacramento, California — a vast improvement over sending mail via ship around Cape Horn. Completion of the overland telegraph line on October 21, 1861 made it possible to send a message from coast to coast in an hour or two; three days later the Pony Express went bankrupt, ruining many investors.

Railroads quickly adopted the telegraph for communications and it vastly speeded up train operation. In 1851, Erie Railroad Superintendent Charles Minot was on a westbound train waiting at Harriman, New York to meet an opposing train. Meeting points were fixed by timetable and, if one train was late, the other just had to wait. Impatient Minot had the telegrapher ascertain from Goshen if the eastward train had left there. It had not, so Minot sent a message to Goshen for the operator there to hold that train until his own arrived and wrote out an order for his train to proceed against the overdue eastward train. The engineer refused to obey the order, so Minot took the throttle and the engineer boarded the train's rear car, certain a collision was inevitable.

On arrival at Goshen the opposing train had still not arrived so the process was repeated and eventually the two trains met at Port Jervis, saving much time for the westbound train. From this incident the system of "train dispatching" evolved, so called because it used telegraphic dispatches (then spelled "despatches") to control train movements.

Both Union and Confederate forces employed the telegraph during the Civil War, and here also it radically changed the way things were done. Telegraph

operators, many of them civilians, became indispensable to the conduct of the war, their messages enabling officers to more quickly assess the size and location of enemy forces and react much faster than before. On some occasions a telegrapher went aloft in a balloon carrying a Morse set and trailing wires to earth, to report on enemy troop dispositions. Certainly this kind of scouting was a distinct improvement over conventional intelligence-gathering methods.

Operators became adept at tapping and eavesdropping on enemy circuits. Some even imitated the sending characteristics of enemy operators to send false messages, and at times they taunted opposing operators by letting them know their traffic had been overheard.

Noted persons who began their careers as telegraphers included Andrew Carnegie, Jessie H. Bunnell (Civil War operator and later a leading manufacturer of telegraph equipment), Richard Sears (founder of Sears, Roebuck), Gene Autry and Chet Huntley (NBC news co-anchor). Many railroad officials, including some residents, began as telegraphers, and a sizeable number of telegraphers who worked in stock brokerages or commodity exchanges went on to success in those fields. Thomas Edison began work in the 1860s as a telegraph operator and his first experimental efforts were telegraph related.

Morse code was not suited to the trans Atlantic cables, nor for use in Europe, so a variation, international Morse code, emerged in 1851. When wireless came into use, both codes were used for a time, resulting in confusion and errors when European ships were in American waters, and vice versa. Following the sinking of the Titanic in April 1912, International Morse was made the standard for radio use. In Morse's first experiments the speed of transmission was about 10 words per minute. With "sound reading" it increased to about 40 wpm, near the limit for sending on a hand key. Use of the typewriter made copying much easier, while the Phillips Code, a glossary of abbreviations introduced in 1879 by Walter P. Phillips, increased sending speeds. When the semi-automatic "Vibroplex" telegraph key was introduced by Horace Martin in 1904, the combination of Vibroplex, typewriter, Phillips Code and skilled operators made communication speeds in excess of 60 wpm commonplace.

The telegraph was used not only by Western Union, Postal Telegraph and railroads, but by many other businesses — mining companies, meat packing houses, automobile manufacturers, oil pipelines, radio networks, telephone companies, stock brokers and commodity traders. A Quebec beer maker connected its offices in Montreal to the brewery in Lanchine with an eight mile line.

One of the more interesting uses of the telegraph was reporting baseball games for radio broadcast. A telegrapher at the ball park sent a play-by-play account to the radio station back in the visiting team's home city. There another telegrapher copied the account, periodically handing slips of paper to an announcer who described the action and attempted to sound as though he was at the game. A system of shorthand was used: for example, SIC meant "strike one, called"; PTF "pitcher throws to first; "B2 OS" ball two, outside" and so on. This system developed into something of an art and several broadcasters became well known. Announcer "Red" Barber and Western Union telegrapher Harry Moorman, working for the Cincinnati Reds, were a particularly accomplished duo. Former President Ronald Reagan, fresh out of college and working as a sports reporter for station WHO in Des Moines, was another who took part in these re-creations, which ended shortly after World War II when improved long distance telephone facilities made broadcasting from remote sites feasible. *(For a few years, something similar was done in Australia with overseas Test cricket broadcasts. Ed).*

Very early in the telegraph era, North American telegraphers began to refer to novice and inept operators as "HAMS", which possibly derived from "ham-minded". Most pioneer wireless operators came from wire telegrapher ranks so when early amateur radio operators began to interfere with commercial traffic, they immediately condemned the interlopers as "HAMS" and the epithet soon came to include all amateurs.

This concludes the overview of the telegraph. Next month we will look at how the telegraph came to Australia. Until then best wishes.

*PO Box 361 Mona Vale NSW 2103

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Repeaters — Additions, Deletions, Alterations. Have you advised the WIA of changes needed to the Repeater list

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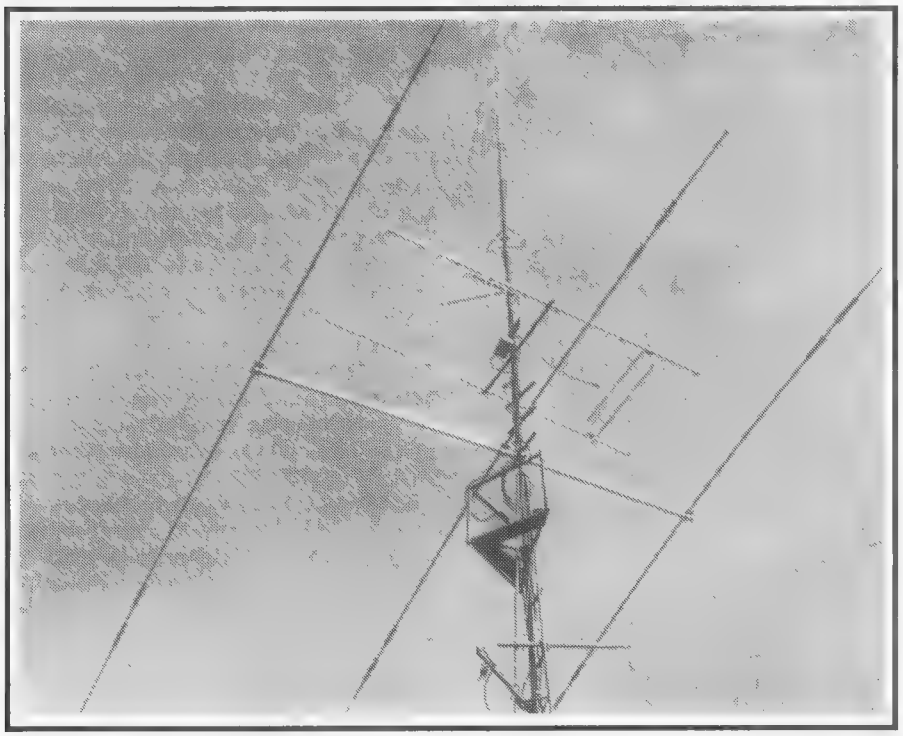
Truckie's Travels

Ian Rosser VK2XB/VK2WAG continues his humorous anecdotes as an interstate truck driver.*



The antenna farm of VK2JUG (now VK2EO) that "bit the dust" in high winds.

Well, it seems I have been absent from the keyboard for an extended period of time. This can be easily explained, folks. I have to work for a living (strange as it may seem!). Much to the confusion (and amusement) of the general public, the poor old truckie is required to work his backside off in order to support the lifestyle the rest of Australia takes for granted! Oh well ... ho hum!

It seems there are some people around the traps who just can't seem to keep their antennas in the air. I wouldn't like to name anybody, but the callsigns of VK2JUG (now VK2EO), VK2FMB and VK2ZOO come to mind. They tell me that a certain great tribander in the Lemon Tree Passage area made severe contact with terra firma — much to the consternation of his neighbours. They tell me this particular fellow has now erected an even BIGGER array! Something in the order of a TH6! Is this what our late Federal President meant by "Good neighbour policy"?

Another fellow in the Glen Innes area (who shall also remain nameless ... hello, Mike!!!) who is a keen 160 m freak had this enormous, full sized 160 m vertical that had withstood the rigours of drought, snow, pestilence and the odd "blow" (anyone who has been in that area in winter will know what I mean) and was claimed to be indestructible. Well, let me tell you something ... No antenna is able to withstand Murphy for too long! Mike's antenna had a little dispute with a tree, or rather the guy wires did, with the result that this mechanical marvel made a somewhat untidy mess on his front lawn. Mike assures me that when he rebuilds said device he will be documenting it for all the 160 m enthusiasts out there.

This same man is the resident repeater guru wind generator designer/builder extraordinaire-cum-radio repairer and everything else for the upper tablelands. Take a bow, Mike. Your work is appreciated by all of us who travel through the area.

Some repeaters that MAY NOT be in your lists, or you may not know of their effective range:

146.750 Tamworth — covers from Scone to Tenterfield across to Gunnedah

146.925 Walcha — quite good coverage on New England north of Rocky Gully (near Bendemeer)

147.075 Walcha — fills in the holes of the above

146.950 Glen Innes — I have worked this one from as far down as Goonoo Goonoo (south of Tamworth) right through to the Queensland border on the New England Highway.

The linked UHF repeaters of Wollongong/Goulburn are first rate, and I have worked Chris VK2XQW through these quite a bit in the wee small hours as I have travelled south to Melbourne and returned. Chris lives at Terrigal, near Gosford. We have managed to maintain contact most of the time on UHF over travelling distances for me of a couple of hundred kilometres. If you don't believe me, ask Chris.

A view of the feedpoint of VK2FMB's 160 m vertical.

The VK3RNE UHF repeater is also very good and I have worked it almost all the way to Wagga Wagga and beyond Holbrook as I have travelled on both the Hume Highway and the Olympic Way.

There is a whole raft of other repeaters whose ranges I can report, but they will have to wait for another occasion as this truckie is leaving for Brisbane for delivery on Monday 12/4/93 ... I'll bet you all had that day off!

Cheers until next time.

Indianna VK2XB/VK2WAG

(Note: Ian would welcome news items for his columns, preferably via packet VK2XB @ VK2EHQ or TCPIP VK2XB AMPR ORG (44.136.17.23). Ed).

* *13 Pemworth Close, Wyoming, NSW 2250*

nr

VHF/UHF An Expanding World

*Eric Jamieson VK5LP**

All times are UTC

10 GHz Activity in VK5

On Thursday 22 April **Roger VK5NY** portable at Cape Banks lighthouse QF02EC, near Carpenter Rocks, and **Bill VK5ACY** portable at Minarapa PF84RG, near Parndana, Kangaroo Island, worked 10 GHz narrow band SSB and FM with 5x9 signal reports exchanged both ways over a path of 355.4 km, setting a new national record for that band.

Roger having achieved his WAC on six metres, the first in VK5, and with the eventual departure of DX from that band, about a year ago set out to build gear for 10 GHz, using two systems each with a 406.4 mm dish and penny feed running 160 mW of power, with an FT290R to provide the 144 MHz IF. Following early experiments on short paths and nobody else to work on narrow band, it became necessary to go further afield.

With this in mind, Roger travelled to Kangaroo Island on 3 April and left with Bill the second unit. Contacts were made from Cape Jervis to Bill on Kangaroo Island with S9+ signals. From his home QTH of Mount Wilson PF94HS, a 118 km path, Roger found that his TH6 antenna on the 24.4 m tower proved to be an excellent reflector to the island and was able to set the dish by the shack door and work Bill by scatter from the TH6!

Further portable tests from north of Adelaide at Two Wells to the sea-level site at Kingscote on Kangaroo Island provided good signals but with flutter over the 144 km path. From Mount Barker and Hoad's Hill through the Mount Lofty Ranges to the island provided good results.

On 7 March, with Bill at Vivonne Bay, KI, Roger travelled to Kingston but the 255 km path provided no signals. On 12 March Roger, while at Binney Lookout near Meningie, worked Bill at Mount McDonald over the 212 km path. On 17 April, Roger drove again to Kingston and at nearby The Granites worked Bill at 5×9+ with a 250 km path. Driving on to a hill near inland Mount Burr in the south east, and from South End on the coast, no contacts were made.

On 21 April Bill reported excellent signals to VK3 and VK7 on VHF and UHF, so they decided to go portable again, Bill at Minarapa area near Parndana on Kangaroo Island. Roger, following the south east coast made 5×9+ contacts to Bill from The Granites, Cape Jaffa, Robe, Beachport and South End, the latter being the location of no signals on the previous Saturday. It was apparent that on this occasion some assistance was received from a coastal inversion.

At Mount Gambier Roger copied weak signals from Bill's 10.368 GHz beacon, then travelled about 10 km towards Carpenters Rocks where Bill's beacon was still audible from a roadside position. Whilst there, Greg VK5ZGY stopped while on an early morning work-call and was surprised to see Roger with a dish on a tripod and his two metre beam, many km from his home, apparently happy on a cold foggy morning! Greg's ears were treated to a 10 GHz beacon signal from Kangaroo Island over the 350 km path.

Moving to Cape Banks lighthouse, Roger was pleased to exchange an S9 signal with Bill at 2213 UTC on 22 April, first on narrow-band FM and then SSB. The reports were S9 both ways, thus setting a new distance record. At the same time, Bill was suffering QRM from an overhead Orion aircraft!

Not content with that, Roger travelled to the VK3 Portland lighthouse but the inversion was now dissipating and no contacts were made and the two metre link was suffering from strong QSB. Roger found that the heat of the day being re-radiated from the rock surfaces near the cliff had caused a noticeable degradation in the receiver noise figure when pointing the dish in Bill's direction. A last try from the look-out tower at Mount Richmond produced no signals. The dish just clearing the tree line could detect heat noise from the tree foliage adjacent to the tower. After a long night of driving and suffering a condition Roger called "microwave fatigue," it was decided to return home.

10 GHz narrow band is a new exciting experience for VK operators, from available kits or rolling your own. The UK RSGB Microwave Committee Components Service, now run privately, and the German DB6NT Short Kits, are sufficient to ensure operation on this exciting band with a suitable 144 MHz IF, without the need for professional test equipment. Roger suggests the UK kits and for the more experienced UHF home constructor the German kit which does not provide construction detail nor a number of components, whereas the UK kits provide detailed construction manuals and all the hard to find components. Some 200 transverter kits have been supplied to date. These kits provide a rewarding opportunity and enjoyment for home constructors to embark into the microwave arena.

English and European distances over 1000 km have been achieved and contacts over 200 km are very common; even EME contacts have been made. When conditions are right the 10 GHz band provides contacts equal to 144 MHz. The days when the use of plumbing and wave guides were the norm are all but gone.

Recently, a source of 57 cm aluminium dishes for 10 GHz became available in Australia at a reasonable price, plus associated parts, relays and feeds if you do not wish to "roll your own."
(If Roger or Bill can eventually span the water path to Albany or other southern points in Western Australia, then a distance of 2000 km would be within their sights. There is little doubt it will be done, it is only a matter of time before such an historic event occurs and the man with the gear at the WA end will probably be Wally VK6KZ .... VK5LP).

I note also from *The World above 50 MHz* in QST that on 18 July two US groups spanned 865 km for a notable inland contact. W6HCC worked WA6EXV and WA6OWD with S8 reports on CW. W6HCC ran a home-brew transverter in a 15 watt TWT with a four foot dish. WA6EXV used a 40 watt TWT and a four foot dish, while WA6OWD had the same antenna and a 10 watt TWT. The US continental record for the 10 GHz band is 957 km.

Queensland

Lance VK4ZAZ writes to say that six metres has been very quiet in the Brisbane area. He hopes the sudden but expected demise of Cycle 22 may usher in a good Es season with multiple hop paths providing some surprises.

John VK4TL from Malanda in North Queensland has the following to report on six metres during the winter period. 3/6: JA5CMO; 5/6: JH1WHS, JI1HFJ, JI7NQW, JK7QYZ; 6/6: JT1KAA; 19/6: VK2PB, VK2XN, ZL3TY, VK2TNT, VK2BKL; 3/7: P29BPL/b; 4/7: ZL2TPY; 24/7: JA7WSK; 18/8: VK8AH; 27/8: JH1WHS; 28/8: JA1VOK, JH1WHS, JL1GHQ/p. John has also received confirmation of his contact with T20AA on 27/03/93.

Ron VK4BRG sends a copy of a recent Packet message which reads *VK9MM Mellish Reef worked at 0632 on 20 September. He was heard weakly on 50.120 SSB calling CQ. Once he heard me he reported turning his beam and signals were 5x9 each way. He also reported I was their first six metre contact. He was heard later calling with fast CW.*

Ron also reports that during September an inversion brought in 2 metres and 70

cm repeaters from as far south as Bundaberg, a distance of around 700 km. Best contacts were at 2115 on 19/9 to VK4KAB and VK4WPK, both in Bundaberg, on 439.0 MHz simplex.

New Caledonia on two metres

Ron VK4BRG also reports that around 0757 on 21/9 he was trying to raise the Bundaberg repeater on 146.800 when he heard a strange ident, which turned out to be the repeater in Noumea. He worked Eddie FK8CR and Guy FK8DH with 5x9 signals. He then worked FK8DH direct on 145 MHz FM with signals 5x9 each way. They tried 70 cm but no results. The distance is about 1500 km.

Ron said the repeater remained audible for nearly four hours until 1145 when he ceased observation. He tried again next morning but the band had closed. Ron worked seven different FK8s via the repeater and they mentioned that during the past few days they had been working into the Bundaberg and Gladstone areas.

When one looks at the map distances there seems no reason why two metre contacts should not also be possible with Lord Howe Is, Norfolk Is, Vanuatu, Solomon Is and even Fiji. However, I am not aware of any operators with two metre capabilities, let alone on any higher band.

The obvious reason for lack of contacts are the missing dedicated VHF operators, which is understandable given the remoteness of the locations. Most help would come from the establishment of two metre repeaters — at least they would give an Australian operator a chance to alert someone, whereas a beacon could churn away for hours without response. Oh well. I suppose it is really only wishful thinking on my part!

First worked from Australia

Lance VK4ZAZ also referred to the above list and said that I had not included any of the KA prefixes which were assigned the US personnel in the immediate post-war occupation of Japan. He mentions KA7AX on 22/06/60 together with other KA stations active around that time.

I suppose it can be said that the KA calls are located in Japan and thus not a different country, but then you have the Vatican City in Italy and the United Nations in the US counting for DXCC, so there may be little difference. Anyway, have you an opinion on the above and are there any claims for working KA stations? If so, please send call-sign, date, time and mode.

Six metre repeater

A message, which arrived too late for inclusion last month, came from **John VK3ATQ** to say that he and **Mark VK3NZY** had been involved in the establishment of a six metre repeater on Mount Lookout in the Gippsland area. The call-sign is **VK3RMR** and it operates on 53.6/52.6 MHz with a nominal output of 25 watts and is powered from solar panels. The power could be increased to 100 watts with the installation of more panels. A diplexer is used in conjunction with a pair of in-phase 5/8 wavelength vertical antennas mounted on a 30.5 m tower. The antenna gain is 6-7 dB.

Reports of contacts via the repeater would be appreciated by either John or Mark. Brisbane stations are amongst the most favoured distances to use the repeater during the coming Es season. Given a good Es opening, across town signals could be stronger via the repeater than direct!

Report from the USA

Emil Pocock W3EP, writing in his QST columns *The World Above 50 MHz,* says that on 50 MHz Es openings during July were nearly as extensive as in June. Larry Lambert N0LL (EM09) who is strategically placed near the centre of the continental 48 states, reported Es on all but seven days in July. The eastern half of the country worked Europe on at least three days, coast-to-coast double-hop conditions appeared on at least two evenings, and propagation to the Caribbean was good on several occasions.

CU1EZ in the Azores Islands (HM76) reported openings to the US and Canada on 5 and 6 July between 2100 and 0000. On 5/7 Antonio's log shows three dozen contacts stretching from New York in the north, Ohio to the west and Georgia to the south. He also worked several stations in Texas. On 6/7 he included Ontario in Canada to his list.

Emil says the Azores Islands are strategically situated one Es hop from much of Europe and two hops from north-eastern USA. The log from CU1EZ shows long runs of European contacts immediately followed by US stations, although at times he can work both ways simultaneously!

With the reports of excellent Es conditions prevailing in the US and Europe during their recent summer, there exists the real possibility that the southern hemisphere may be given a similar treat. It will not be long before we know.

Moonbounce for Satellite Operators

That's the big heading in the October issue of QST's *The World Above 50 MHz.* **Emil W3EP** reports that working through OSCAR 13, Mir, RS-10 and other spacecraft isn't the only way to work DX via satellite. For two decades reflected signals from the moon have been used to make DX contacts.

On 6 and 7 November, the Toronto VHF Society will operate VE3ONT on 144, 432 and 1296 MHz using the Algonquin Radio Observatory's 150-foot dish antenna. The Institute for Space and Terrestrial Science, which operates the big dish, has invited a group headed by Dennis Mungham, VE3ASO, and Michael Owen, W9IP, to instal amateur equipment at the site. The fabulous gain of the antenna, sensitive receivers and high power transmitters will allow VE3ONT to make EME contacts with most OSCAR-class stations.

The Algonquin dish has about 34 dBi gain at 144 MHz, 43 dBi at 432 MHz and 53 dBi at 1296 MHz. The VE3ONT operators will mount special left-hand circular polarised helical antennas at the feed point and install 1500 watt transmitters on 144 and 432 MHz and 100 watts on 1296 MHz. You should be able to work VE3ONT via the moon with 100 watts on 144 and 432 MHz and at least 25 watts on 1296 MHz. Right-hand circularly polarised antennas will work best, but horizontal or vertical antennas will be nearly as effective.

OSCAR stations should track the moon as with any other satellite. Stations with antennas fixed horizontally also have an excellent chance to make contact but only during the 30 to 60 minutes when the moon is near the horizon. Moon rise and set times can be found in a good almanac, from the daily paper or a moon-tracking system.

VE3ONT will operate split frequency to reduce confusion and interference. Operators plan to call CQ on 6/11 between 0340 and 1700 on 432.050 and listen from 432.050 to 432.060. On 7/11, operating times are 0450 to 1730 on 1296.050 and receive 1296.050 to 1296.060. The only 144 MHz schedule was on 10/10 but this advice is too late for that band. It is suggested CW will be the best mode for responding. If conditions are poor VE3ONT may switch to 30 second sequencing. In that case the big dish will transmit during the first 30 seconds of each minute and listen during the second 30 seconds, even though this is not standard procedure. Emil suggests you figure out how VE3ONT is operating before calling. The VE3ONT operators are accepting no schedules, but liaison will be maintained on 14.345 MHz during the day.

I am not sure how readily Australian amateurs can use the above information but I thought you should be aware of this interesting event. Delivery time of AR should give you several days to prepare for the occasion — so good luck. Some

years ago when WA6LET conducted 144 MHz experiments from the large Stanford University dish, I was successful in receiving a number of EME stations using a stacked pair of 13 element yagis. As expected, the signals were not strong but were recorded on tape. I tried transmitting with my modest 100 watts but did not receive a reply which was no surprise as my local conditions were not good due to pouring rain!

Closure

From the lack of correspondence it appears very few operators are involved in outstanding contacts. So far the spring equinox appears not to have provided any F2 contacts. Due to the many thunderstorms, for most of the past week my antennas have been disconnected from all equipment, which is not an aid to operating.

However, the Es season will be all but upon us by the time you read these notes. Please write with any news of special contacts. Keep a watch on 144 MHz for Es openings during short-skip on six metres.

Late news of importance

Last month I reported on the inland openings to Sydney, Canberra and Tasmania on 144 MHz, principally by Roger VK5NY and Bill VK5ACY, during June and July, all thanks to the VK5VF two metre beacon.

Well, its been done again. Just before 11 pm local on Tuesday 5 October, **Roger VK5NY** on Mount Wilson near McLaren Vale, was about to climb into bed when he received a phone call from Mike VK2FLR in Sydney to say the VK5VF two metre beacon was audible.

Mike, with Chris VK1DO and Charlie VK3BRZ on the 3690/5 KHz VHF liaison net, had been discussing the weather and decided to check band conditions on two metres and found the Adelaide beacon. As a result of the call, Roger made the following contacts on two metres SSB: 1319 VK2FLR 5x2 sent, 5x2 received; 1320 VK3BRZ 5x9, 5x9; 1322 VK1DO 5x2, 5x4; 1323 VK2ZAB 5x4, 5x4; 1328 VK2ZRU 5x2, 5x3; 1617 VK3KWA 5x9, 5x9; 1626 VK3ZGJ 5x6, 5x6; 2126 VK3AUG 5x3, 5x3; 2130 VK3DUT 5x9, 5x9; 2138 VK3AFW 5x6, 5x6; 2146 VK3CY 5x8, 5x8; 2147 VK3BBB 5x8, 5x8; 2229 VK2FLR 5x2 to 5/5 each way; 2242 VK1DO 5x5, 5x5; 0001 VK1VP 5x2, 4x3 to 5/3, but Eddie was having trouble with local noise and being situated behind Black Mountain in Canberra did not help. Roger said an interesting factor was that the stations worked were on a broad beam heading with no readily defined peak.

On Kangaroo Island, Bill VK5ACY worked VK2FLR. Mick VK5ZDR worked VK2FLR and VK1DO; VK5KCX worked VK2WWW at Gilgandra, west of Sydney. VK5ZVA at Port Neill worked VK3CY and VK3DUT. All these stations probably worked other stations than those listed, but at least they were there. Roger VK5NY phoned me during the morning and I tried two metres with VK2FLR and VK1DO but I was only able to hear the odd word from both stations, despite my mast-head pre-amp.

There is no question that the operators involved generally had very efficient stations using large antenna systems and knew what they had to do when it came to weather patterns. They were dedicated to the extent that they stayed out of bed all night to make use of the conditions.

On 70 cm Roger VK5NY worked at 1526 VK1DO 5x2, 5x5. Chris had been copying Roger earlier but due to an antenna fault his SWR was too high so he had to move up from 432.100 to make better use of his 70 watts. Roger also worked at 1617 VK3KWA 5x2, 5x8; 2300 VK1DO 5x2, 5x5.

Now on to the soap-box — again! This latest round of contacts was only made possible through the signals provided by VK5VF, the Adelaide two metre beacon. Thanks to the work of David VK5KK and the occasional helper, he ensures the Adelaide beacons remain on the air continuously, are efficient and make good use of their excellent site on Mount Lofty.

From their central location in the southern regions of the continent, no other beacons can provide the early warnings as does VK5VF, and if ever the value of beacons needed to be demonstrated, here is an excellent example. In particular, the two metre beacon provides signals which can be monitored in both an easterly and westerly direction — resulting this year in coast to coast contacts from VK5 to Perth in the west and Sydney to the east.

With some dismay, I recently learnt that the VK6RTW beacon in Albany is turned off during the winter months, which seems to defeat its purpose as winter contacts are not unknown. The Mount Gambier beacon is also missed and I am never sure what is available from Victoria. The Sydney beacons are well sited and maintained for continuous operation. The Canberra beacon does its best but a good site is not available.

Gordon VK2ZAB said it is seven years since similar openings occurred and these would have been at a low point between solar cycles. This tends to further support my long time expounded view that Es improves considerably during the absence of F2 propagation on six metres, in turn leading to increased Es contacts on two metres. A relationship may also exist between the above situation and certain tropospheric conditions, and with happenings as occurred last night, we may be on the path to learning more about propagation, particularly over land.

Finally, it would be a decided advantage to have a central body which could oversee the siting of beacons and assist with the provision of actual beacons or provide finance for them to be constructed. In the UK there are several people, like Geoff GJ4ICD, who build beacons and send them to places where they are needed. It seems a pity that we cannot do the same.

Closing with two thoughts for the month:

1. Thunder is good; thunder is impressive. But it is lightning that does the work; and
2. Card games can be expensive, but so can any game where you hold hands.

73 from The Voice by the Lake.

**69 Meningie SA 5264*

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Stolen Equipment

The following equipment has been reported stolen. If you have any information that may lead to the recovery of the equipment, please get in touch with the advised contact as soon as practicable.

Make: ALINCO
Model: DR112T
Serial Number: 0006697
Type: 2 m FM Transceiver
Accessories: Part of mounting bracket, microphone
Modifications: Nil
Stolen from: private car — by smashing drivers's window
Date: 13 Sep 1993
Other items taken: Panasonic AM/FM stereo Radio/Cassette
Reported to: Canberra Police
Owner: Andrew Davis, 30 Crowder Cct, Stirling ACT
Callsign: VK1DA
Contact details:
Home Phone (06) 287 1011
Work Phone (06) 263 2007

ar

Have you advised the the SMA of your new address?

Over to You — Members' Opinions

All letters from members will be considered for publication, but must be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

"Over to Fall"

Amateur Radio gives many people enjoyment, not the least being one of chasing new prefixes. It's a quest that may never be satisfied, due to the endless combinations available and those which appear to be "dreamed up".

Most have some basis for issue, be it for a local event, national milestone etc, etc. However, recently one was heard that I thought was in very poor taste, and a sad reflection of politics intruding into the bands. I refer to "R10F", commemorating the shooting down of the Korean Airliner over the disputed Islands north of Japan by the Russians.

What do other members think about such issues?

Neil Penfold VK6NE
2 Moss Court
Kingsley WA 6026

Another Channel 0

I noted with interest the item in the VK2 broadcast on 19th September regarding interference from stereo TV transmissions on channels 0 and 5A and, in particular, the letter from the Australian Broadcasting Authority which stated in part that all channel 0 transmitters in NSW referred to by the WIA had been cleared.

I would like to point out that Prime Television operates a stereo channel 0 service in Tamworth. Furthermore, this station has a positive carrier offset such that the secondary sound carrier is on 52.005 MHz — actually inside our "exclusive" allocation!

It was originally proposed that this service would move to UHF with the commencement of aggregation in 1992, however Prime objected and decided to remain on channel 0 permanently.

I can only assume that either the WIA did not consider this particular transmitter worthy of mention in their correspondence with the ABA, or that the ABA itself is unaware of its existence.

Jeff Pages VK2BYY
11 Graham St
Tamworth NSW 2340

Interesting QSLs

Have just read the contribution about QSL information by VK3TL, which I found most interesting (September issue of *Amateur Radio*).

Ken called on me some five years ago and was given access to my card collection, of which he selected some to be of interest to his current activities.

I have since forwarded him a few more, which I hope he finds worthy of adding to his exhibition.

No doubt Ken will find a few more interesting items to produce, from time to time. *(We look forward to them too. Ed)*

Tom Laidler VK5TL
18 Albion Ave
Glandore SA 5037
ar

Technical Correspondence

Antenna Doubts

With reference to the article "Simply, an all band antenna", by George Thatcher VK2EHN, in the September issue of *Amateur Radio*.

About ten years ago I bought one of these "Black CTW" antennas. Not the same as the vertical version described, but the "other" Black CTW, that is an actual dipole in physical shape. It also came in two types, one for 80 m and the other for 2.0 MHz. I bought the latter version.

I always had mixed success, despite numerous trials in the way it was hung in the air. The brochure suggested that it be as high as possible, in practical terms. Initially this was not done and only one leg was actually "skyward", the other being the ground counterpoise. Later it was indeed hung as a dipole, with the three points hung on separate poles about six metres high. Possibly they ought to have been twice that again, but I didn't have that sort of length available to use.

However, it never was as flat as claimed, with a peak of five to one near 40 m and near to flat on other bands. It also seemed to be deaf when compared to any other antenna that I had. As well, it seemed not to be radiating as it should.

To be fair, I have seen the vertical version working at one fellow amateur's abode, and can only assume that either my antenna is not a good one, or the installation of it, or both.

Which is a pity, as I would have liked to use it particularly on the lower bands, instead of my existing 160m dipole.

Peter Scales VK6IS
Box 47 Chidlow WA 6556
ar

Silent Keys

The WIA regrets to announce the recent passing of:-

W J (William)	TREZONA	VK3ZEM
J (Jim)	STEVENS	VK3ZK
E K	WILLIAMS	VK4VDD

ar

Editor's Comment

Continued from page 3

meantime, so the change is hardly noticeable.

Our organisation, as we well know, consists of seven autonomous Divisions. Sometimes it seems that our founding fathers chose words more prophetically than they knew. Not only do we now, from time to time, find there is division between Divisions, not to mention between Divisions and Federal, but there is even division inside some Divisions!

If amateur radio is to survive in Australia it will only be as a result of a united front presented by the WIA to all who would seek to take privileges from us. Particularly is this so as regards spectrum space in these days of market based spectrum management.

We need divisions between us like we need the proverbial "holes in the head". We need union, not division, to take us "beyond 2000".

Our future is in our own hands!

Bill Rice VK3ABP
Editor
ar

HF PREDICTIONS

Evan Jarman VK3ANI

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for the five bands from 14 to 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1 μV (dBU) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 μV in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50 μV at the receiver's input and the S-meter scale is 6 dB per S-point.

μV in 50 ohms	S-points	dB(μV)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST The major part of NSW and Queensland.

VK SOUTH Southern-NSW, VK3, VK5 and VK7.

VK WEST The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

ET

VK EAST — MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10.6	-2	8.1	3	-5	-16	-34	..
2	10.5	-8	8.1	0	-5	-15	-32	..
3	14.4	0	11.2	0	1	-3	-12	-25
4	21.2	6	16.3	-4	5	6	3	-3
5	27.4	8	21.0	-9	5	9	9	7
6	28.6	10	22.9	-11	5	10	11	10
7	27.9	10	22.8	-10	5	10	11	9
8	27.1	10	22.0	-7	7	11	11	9
9	26.0	11	21.6	0	11	13	12	9
10	24.9	14	20.0	9	16	16	14	9
11	23.7	17	19.0	19	21	19	15	8
12	22.7	20	18.1	27	26	22	15	7
13	22.1	22	17.6	34	29	24	16	7
14	21.3	24	16.9	37	31	24	15	5
15	20.5	25	16.6	38	30	23	13	2
16	19.3	26	15.1	38	29	21	10	-2
17	18.2	27	14.1	37	27	18	6	-7
18	16.8	28	13.0	35	24	14	0	-14
19	15.8	29	12.1	33	21	10	-4	-21
20	16.4	28	12.5	34	23	12	-2	-18
21	16.0	25	11.8	29	18	7	-8	-25
22	14.6	22	11.2	22	13	2	-13	-31
23	14.2	17	11.0	17	9	0	-15	-32
24	13.0	10	9.8	10	3	-7	-22	...

VK EAST — SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	29.8	26	24.7	35	37	36	33	28
2	30.3	26	25.0	36	38	36	33	29
3	30.3	27	24.9	37	38	37	34	29
4	29.9	27	24.5	38	39	37	34	29
5	29.1	28	23.7	40	40	38	34	29
6	28.1	29	22.8	44	42	39	34	28
7	26.9	31	21.7	48	44	40	34	27
8	25.6	32	20.6	50	45	40	33	26
9	24.3	33	19.5	50	44	39	32	23
10	23.2	34	18.5	50	44	38	30	21
11	22.5	34	17.9	50	43	37	29	19
12	21.6	35	17.1	50	43	36	27	17
13	20.6	36	16.2	49	41	34	24	14
14	19.4	37	15.1	48	40	32	21	9
15	18.2	38	14.1	47	38	29	17	5
16	16.9	39	13.0	45	35	25	12	-1
17	15.8	40	12.0	44	32	22	8	-6
18	16.4	38	12.4	44	34	24	10	-3
19	19.3	34	14 5	42	36	29	19	8
20	23.3	30	17 7	40	37	33	27	19
21	26.2	28	20.3	38	38	35	30	24
22	27.3	28	21.5	37	37	35	31	26
23	27.9	27	22.3	35	37	35	31	26
24	28.7	27	23.4	35	37	35	32	27

VK EAST — AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.7	10	11.0	10	9	3	-7	-20
2	15.0	7	11.5	6	6	1	-8	-20
3	15.4	4	11.7	2	5	1	-6	-17
4	18.4	5	13 8	-1	5	5	0	-7
5	21.5	6	15.0	-4	5	6	4	-1
6	21.6	6	15.1	-6	4	6	4	-1
7	21.7	6	15.2	-6	4	6	4	-1
8	21.6	7	15.1	-4	5	7	4	-1
9	20.9	8	15.1	-1	7	7	4	-2
10	19.8	9	14.9	3	9	8	3	-4
11	18.7	10	14.7	8	11	8	1	-7
12	17.7	12	14.1	11	12	8	0	-11
13	16.9	15	13.4	16	14	8	-2	-14
14	16.3	19	12.9	21	15	8	-4	-18
15	15.7	23	12.3	26	17	7	-6	-22
16	15.0	26	11.6	28	17	6	-9	-27
17	14.4	28	11.0	28	16	3	-13	-32
18	13.8	29	10.5	28	14	1	-17	-37
19	13.6	30	10.1	28	13	0	-19	-39
20	14.2	29	9.7	29	15	2	-15	-35
21	13.7	25	9.4	24	11	-1	-18	-38
22	13.2	21	9 1	19	8	-3	-20	...
23	13.2	16	9.2	15	6	-4	-19	-38
24	14 0	13	9.7	13	7	-1	-15	-31

VK EAST — EUROPE

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10.4	-3	8.2	2	-6	-18	-37	.
2	9.6	-10	7.6	0	-7	-19	-38	.
3	9.6	-14	7.6	0	-6	-17	-34	..
4	11.4	-9	8.8	-1	-3	-10	-24	...
5	14.6	-1	11.6	-2	1	-2	-11	-23
6	18.3	3	14.7	-4	3	3	-2	-10
7	21.4	6	17.2	-4	5	6	3	-2
8	23.6	9	19.1	-1	8	10	8	3
9	25.1	12	20.3	6	14	15	12	7
10	24.8	16	20.0	18	22	20	16	10
11	23.6	20	19.0	28	27	24	18	10
12	22.7	22	18.2	33	30	25	18	9
13	22.2	23	17.7	36	31	25	17	7
14	21.5	22	17.0	37	30	22	12	1
15	19.2	23	15.2	36	26	17	5	-8
16	16.7	25	13.6	33	21	9	-6	-23
17	14.7	27	11.6	28	14	0	-19	.
18	12.8	28	10.1	23	5	-12	-35	.
19	11.7	29	9.2	18	-2	-21	..	..
20	11.0	29	8.6	15	-7	-28	.	..
21	10.6	25	8.2	11	-10	-30	.	...
22	10.6	18	8.4	9	-9	-28	...	...
23	10.8	10	8.4	7	-6	-21	...	...
24	10.9	4	8.5	5	-5	-18	-38	...

VK EAST — USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	21 7	7	16.3	-1	7	7	4	-2
2	19.3	8	14.6	4	9	6	0	-8
3	17.1	10	12.9	9	9	4	-5	-17
4	15.7	12	11.8	13	9	1	-10	-25
5	14.8	16	11.1	17	9	0	-15	-33
6	14.0	20	10.5	20	9	-3	-21	.
7	13.5	25	10.3	23	8	-6	-26	...
8	13.5	26	10.1	24	8	-6	-27	...
9	13.2	28	10.0	24	8	-7	-29	...
10	12.2	29	9.2	21	2	-15	..	...
11	10.6	31	8.1	14	-8	-30	...	.
12	10.5	31	8.1	14	-9	-31	...	..
13	13.5	28	10.0	25	9	-6	-27	..
14	13.4	29	10.4	26	10	-4	-24	...
15	13.1	23	10.1	20	7	-6	-25	..
16	16.8	19	12.9	21	17	9	-1	-14
17	15.5	13	11.9	12	10	4	-7	-20
18	16.1	7	12.2	5	7	3	-5	-16
19	19 0	7	14.3	0	6	6	1	-6
20	22.9	8	17.5	-6	5	8	6	2
21	25.8	8	20.0	-10	4	9	9	6
22	26 8	8	21 1	-11	4	8	9	7
23	26.6	7	20 2	-10	4	8	8	5
24	24 4	7	18.5	-6	6	8	7	2

VK EAST — ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	29.0	15	23.7	16	22	23	20	16
2	30.3	13	23.2	14	21	22	20	16
3	30.8	13	24.0	14	21	22	20	17
4	31.7	13	24.1	15	22	23	22	18
5	31.6	15	24.9	17	24	25	23	20
6	30.6	16	25 1	20	26	26	23	19
7	29.5	17	24.0	25	28	27	23	18
8	28.2	18	23.5	32	32	29	24	18
9	27.1	20	21.9	39	36	31	25	17
10	25.9	21	20.8	41	36	31	23	15
11	25 0	22	20.0	42	36	30	22	13
12	24.6	22	19.6	43	37	30	22	12
13	23.8	23	18.8	44	36	29	20	10
14	22.7	23	18.1	43	35	27	17	6
15	21.1	24	16.5	41	32	24	12	0
16	19.6	24	15.3	39	29	19	6	-7
17	17.8	25	13.8	36	24	13	-2	-19
18	16.2	25	12.5	32	18	4	-14	-34
19	13.1	26	10.1	21	1	-19	.	...
20	12.9	26	10.0	20	-1	-21	...	...
21	18.0	20	13.6	29	20	9	-5	-21
22	25.8	16	20.0	29	28	24	18	10
23	27.7	16	22.1	23	26	25	21	15
24	28.0	15	22.6	18	23	23	20	15

VK EAST — EUROPE (long path)

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10.9	-5	8.2	1	-2	-11	-26	...
2	11.2	0	8.5	3	-2	-11	-26	...
3	11.2	4	8.6	5	-1	-12	-28	...
4	10.8	6	8.3	6	-3	-15	-34	...
5	9.9	9	7.7	6	-7	-22	...	...
6	9.9	16	7.8	8	-8	-25	...	...
7	11.8	23	9.3	17	1	-13	-35	...
8	15.1	24	12.1	26	15	4	-11	-29
9	15.5	24	11.8	26	18	9	-3	-17
10	15.5	17	11.7	17	13	7	-3	-16
11	17.9	11	14.2	9	11	8	1	-7
12	17.2	5	13.6	0	5	4	-1	-9
13	16.5	0	13.3	-6	2	1	-3	-10
14	15.8	-4	12.3	-9	0	0	-4	-12
15	15.1	-8	11.6	-11	-2	-1	-6	-13
16	14.4	-11	11.0	-12	-2	-2	-7	-14
17	14.1	-12	10.6	-11	-2	-2	-7	-15
18	14.9	-10	11.1	-13	-2	-2	-6	-13
19	17 1	-4	13.4	-13	-2	-1	-4	-10
20	15.2	-7	11.8	-10	-2	-2	-7	-15
21	13.3	-9	10.2	-6	-1	-4	-11	-22
22	12.1	-10	9.3	-3	-1	-6	-15	-28
23	11.3	-10	8.6	-1	-2	-8	-19	-34
24	11.0	-8	8.3	0	-2	-10	-23	-39

VK SOUTH — AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.9	15	11.5	15	12	6	-5	-18
2	16.5	12	12.4	12	11	6	-3	-15
3	19.5	11	14.9	9	12	10	4	-4
4	22.0	10	15.7	4	11	11	7	1
5	22.0	9	15.7	1	9	9	6	0
6	22.0	8	15.7	-1	8	9	6	0
7	21.8	8	15.5	-1	7	8	5	0
8	21.6	8	15.4	-1	7	8	5	0
9	21.5	9	15.2	1	8	9	5	0
10	20.7	10	14.7	4	10	9	5	-2
11	19.7	11	13.9	8	12	9	3	-4
12	18.4	13	12.9	12	13	9	1	-8
13	17.3	15	12.1	16	14	8	-1	-13
14	16.3	18	11.4	21	15	7	-4	-18
15	15.8	23	11.0	26	17	7	-6	-22
16	15.1	26	10.5	28	17	5	-10	-27
17	14.6	27	10.1	28	16	4	-13	-31
18	14.1	28	9.9	28	14	1	-16	-36
19	13.9	29	9.7	28	14	0	-18	-38
20	14.1	29	10.0	29	15	1	-16	-36
21	14.5	27	10.1	28	15	3	-13	-32
22	14.1	24	9.9	23	12	1	-15	-34
23	14.2	20	9 9	20	11	0	-15	-33
24	15.0	17	10 6	18	11	3	-10	-26

VK SOUTH — ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	22.4	13	17.9	11	15	14	9	2
2	22.7	12	18.4	9	15	14	9	2
3	23.1	12	19.1	8	15	14	10	3
4	23.1	12	19.1	9	15	14	10	4
5	23.0	13	18.9	10	16	15	10	4
6	22.7	14	18.6	13	17	15	10	3
7	22.3	15	18.2	17	19	16	10	2
8	21.7	17	17.6	22	22	18	10	1
9	20.9	21	16.9	33	27	20	10	0
10	19.9	23	16.0	36	27	19	7	-5
11	18.9	24	15.2	36	26	17	3	-11
12	18.0	24	14.3	35	24	13	-1	-17
13	17.3	25	13.7	35	22	11	-4	-22
14	16.7	25	13.2	33	20	8	-9	-27
15	16.0	26	12.6	32	18	5	-13	-33
16	15.3	26	12.0	30	15	0	-19	...
17	14.6	26	11.3	28	11	-4	-25	...
18	13.8	26	10.6	25	6	-11	-35	...
19	11.5	25	8.9	10	-16	...	...	...
20	11.3	25	8.8	9	-19	...	...	...
21	15.9	19	12.0	24	11	-2	-20	...
22	19.0	18	14.4	23	19	12	2	-10
23	21.1	15	16.3	18	18	15	8	-1
24	22.0	14	17.3	14	17	15	9	1

VK SOUTH — USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	23.6	8	17.8	-2	8	9	7	2
2	20.9	9	15.9	4	10	9	4	-3
3	18.6	11	14.1	9	11	7	0	-10
4	17.1	13	12.9	13	12	6	-4	-16
5	16.2	16	12.2	18	12	4	-8	-22
6	15.3	19	11.5	21	12	2	-12	-29
7	14.6	23	11.1	24	12	0	-17	-36
8	14.4	25	10.8	26	12	0	-19	-39
9	14.0	27	10.6	26	11	-3	-22	...
10	12.6	29	9.6	23	5	-11	-34	...
11	10.8	30	8.3	15	-7	-28	...	...
12	10.6	30	8.2	14	-8	-29	...	...
13	14.0	28	10.4	27	11	-3	-22	...
14	15.2	28	11.7	31	19	7	-9	-27
15	14.9	23	11.4	24	14	4	-10	-28
16	15.3	16	11.7	17	12	4	-8	-22
17	14.9	9	11.2	9	7	1	-9	-23
18	15.7	5	11.7	3	5	2	-6	-17
19	18.1	5	14.2	-2	5	4	0	-8
20	21.1	6	15.9	-8	3	6	4	-1
21	23.5	7	18.0	-11	3	6	6	3
22	24.7	7	19.2	-13	2	7	7	5
23	25.3	8	20.0	-12	3	8	8	6
24	25.4	8	20.0	-8	5	9	9	6

VK WEST — EUROPE (Long path)

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	9.9	-19	7.6	-3	-6	-14	-28	...
2	10.1	-15	7.8	-3	-7	-15	-30	...
3	10.0	-11	7.8	-2	-8	-18	-34	...
4	9.6	-8	7.5	-1	-10	-21	...	...
5	8.8	-7	6.9	-2	-14	-28	...	...
6	8.8	-3	7.0	-1	-15	-31	.	...
7	10.1	6	8.0	3	-11	-26	.	...
8	12.6	13	10.1	10	0	-12	-30	...
9	15.8	15	12.6	17	10	1	-12	-27
10	16.0	17	12.4	20	13	5	-7	-21
11	13.1	16	10.1	14	4	-6	-22	...
12	12.6	9	9.7	8	1	-8	-22	...
13	16.4	6	11.2	5	6	2	-5	-15
14	15.8	0	10.7	-3	1	0	-7	-16
15	15.2	-5	10.5	-8	-2	-3	-8	-17
16	14.6	-10	9.9	-11	-3	-4	-9	-17
17	14.0	-13	9.6	-12	-4	-5	-10	-18
18	13.6	-15	9.3	-13	-5	-5	-11	-19
19	13.5	-16	9.3	-13	-5	-5	-11	-19
20	13.2	-15	9.9	-11	-5	-6	-13	-22
21	11.6	-21	9.1	-9	-5	-8	-17	-28
22	10.6	-32	8.3	-13	-11	-16	-26	...
23	10.1	-33	7.8	-12	-11	-18	-30	...
24	9.8	-27	7.6	-7	-9	-16	-29	. .

VK SOUTH — EUROPE

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.1	2	8.6	4	-4	-16	-35	...
2	10.3	-6	8.0	1	-6	-17	-36	...
3	10.3	-10	8.1	0	-5	-15	-31	...
4	12.3	-6	9.4	-1	-1	-7	-19	-34
5	16.1	0	12.8	-5	1	0	-7	-16
6	20.3	4	16.2	-8	2	4	1	-4
7	23.3	6	18.8	-11	3	6	5	1
8	23.4	8	19.1	-10	4	8	7	4
9	23.0	9	18.6	-6	6	9	8	4
10	22.1	11	17.9	1	10	11	9	3
11	21.0	14	16.9	11	16	14	9	2
12	19.9	18	16.0	22	21	16	9	0
13	18.9	23	15.1	29	24	17	7	-4
14	18.1	25	14.3	33	25	17	5	-7
15	17.4	27	13.8	34	25	16	3	-11
16	16.8	28	13.2	34	24	14	0	-15
17	15.8	26	12.3	31	18	6	-11	-29
18	13.8	28	10.7	26	10	-4	-25	...
19	12.6	28	9.7	22	4	-13	-37	...
20	11.7	29	9.0	19	-1	-20	...	...
21	11.3	29	8.6	16	-4	-25	...	...
22	11.1	22	8.7	13	-5	-24	...	...
23	11.5	16	8.8	11	-3	-18	...	...
24	11.6	10	8.9	8	-2	-15	-35	...

VK WEST — AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	14.9	20	11.2	21	12	3	-11	-28
2	15.6	16	11.8	17	12	5	-7	-21
3	18.5	14	14.6	14	14	10	2	-8
4	22.5	12	17.3	10	15	14	9	2
5	23.0	11	17.0	6	13	12	9	2
6	23.0	10	18.9	3	11	11	8	2
7	22.8	10	18.7	2	10	11	7	1
8	22.6	9	18.4	2	10	10	7	1
9	22.2	10	18.1	3	10	10	7	0
10	21.8	10	17.7	5	12	11	6	0
11	21.0	12	17.3	9	13	11	6	-1
12	20.0	14	16.1	14	15	12	5	-4
13	18.9	16	15.1	19	17	12	3	-8
14	17.8	20	14.2	24	19	12	1	-12
15	17.0	23	13.5	29	21	11	-1	-16
16	16.4	26	13.0	31	21	10	-4	-20
17	15.8	27	12.7	31	20	8	-7	-24
18	15.1	28	11.8	31	18	6	-11	-29
19	14.5	29	11.2	30	16	3	-14	-34
20	13.9	30	10.6	29	14	0	-18	...
21	13.7	30	10.4	28	13	-1	-20	...
22	14.5	29	10.8	30	16	3	-15	-35
23	14.6	27	11.2	28	16	3	-13	-32
24	14.1	23	10.7	23	12	0	-16	-35

VK WEST — MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	9.8	9	7.5	2	-15	-34	...	...
2	9.7	0	7.5	0	-14	-31	...	...
3	13.4	4	10.0	5	0	-8	-23	...
4	19.9	8	15.3	4	8	6	0	-8
5	24.7	9	18.5	0	10	11	9	4
6	24.9	9	20.2	-3	8	10	9	5
7	24.9	9	20.5	-4	7	10	9	5
8	24.7	9	20.2	-4	7	10	9	5
9	24.1	9	19.7	-2	8	10	9	4
10	23.5	10	19.1	1	10	11	9	3
11	22.7	12	18.8	8	14	13	9	3
12	21.6	15	17.4	18	19	16	9	1
13	20.6	19	16.5	28	24	18	9	-1
14	19.7	23	15.7	33	26	19	8	-4
15	19.0	24	15.1	35	26	18	6	-6
16	18.4	25	14.5	35	25	16	4	-10
17	17.7	26	14.3	35	24	14	1	-14
18	16.8	26	13.1	34	22	11	-3	-19
19	15.9	27	12.4	32	19	8	-8	-26
20	14.9	27	11.5	30	16	3	-14	-34
21	14.2	28	10.8	28	13	0	-20	...
22	14.5	26	10.9	27	12	-3	-22	...
23	13.8	25	10.4	24	8	-7	-28...	
24	12.1	20	9.2	14	-1	-18	..	...

VK SOUTH — MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	10.7	1	8.2	4	-6	-18	-38	...
2	10.5	-6	8.1	1	-6	-17	-35	...
3	14.8	1	11.0	0	2	-2	-12	-24
4	22.2	7	17.1	-3	6	7	4	-1
5	24.8	8	20.4	-9	5	9	8	5
6	24.7	8	20.2	-11	3	7	8	5
7	24.4	7	19.9	-11	3	7	7	4
8	24.0	8	19.6	-10	4	8	7	4
9	23.6	8	19.1	-6	6	9	8	4
10	22.7	10	18.4	1	10	11	8	3
11	21.6	13	17.4	9	14	13	9	2
12	20.4	17	16.3	19	19	15	8	0
13	19.3	21	15.4	28	23	17	7	-3
14	18.4	24	14.6	33	25	17	5	-7
15	17.8	25	14.0	34	24	16	3	-10
16	17.1	26	13.5	34	24	14	0	-14
17	16.4	27	12.8	34	22	12	-2	-18
18	15.7	28	12.1	32	20	9	-6	-23
19	15.1	28	11.5	31	18	6	-10	-29
20	14.8	29	11.2	30	17	4	-12	-31
21	15.6	27	11.7	31	19	8	-7	-24
22	16.2	23	12.1	27	17	7	-7	-24
23	15.3	19	11.5	21	12	2	-12	-29
24	13.4	13	10.1	12	4	-6	-22	...

VK WEST — ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.5	16	21.1	19	23	22	18	12
2	26.8	15	21.6	16	21	21	18	12
3	27.6	15	22.6	15	21	21	18	13
4	28.8	15	21.9	15	21	22	20	15
5	29.5	15	23.5	15	22	23	21	17
6	29.7	16	24.3	17	23	24	22	18
7	29.4	16	24.2	20	25	25	22	18
8	28.6	17	23.4	24	27	26	23	17
9	27.6	19	22.5	31	31	28	23	17
10	26.5	21	22.1	41	37	32	25	17
11	25.4	22	20.5	43	37	31	23	14
12	24.2	22	19.4	43	36	30	21	11
13	23.3	23	18.6	43	35	28	18	8
14	22.8	23	18.1	43	35	27	17	6
15	22.1	23	17.4	42	34	26	15	3
16	21.1	23	16.6	41	32	23	11	-1
17	19.7	24	15.4	39	29	19	6	-8
18	18.5	24	14.4	37	25	14	0	-17
19	16.4	23	12.6	31	16	2	-17	-38
20	13.1	25	10.1	19	-2	-23	...	...
21	12.8	25	9.9	18	-5	-26	...	...
22	17.9	21	13.9	32	20	9	-6	-24
23	23.1	18	17.8	27	25	21	14	5
24	25.8	16	20.2	23	25	23	18	11

VK WEST — SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.5	14	19.4	13	18	17	13	7
2	24.6	14	19.9	13	18	17	13	7
3	24.8	14	18.4	13	18	18	14	8
4	24.7	14	20.3	15	19	18	14	8
5	24.6	15	20.1	18	21	19	15	8
6	24.3	16	19.9	22	23	21	15	8
7	23.9	18	19.5	27	27	23	16	8
8	23.5	20	19.0	33	30	25	17	8
9	22.4	23	18.0	38	32	25	16	6
10	21.3	24	17.0	39	32	24	14	3
11	20.2	26	16.1	40	31	23	11	0
12	19.2	26	15.3	39	30	21	8	-5
13	18.4	27	14.6	39	28	18	5	-9
14	17.7	28	14.0	38	27	16	3	-12
15	17.0	29	13.4	37	25	14	0	-16
16	16.3	29	12.6	36	23	12	-3	-20
17	15.4	30	11.7	34	21	9	-7	-26
18	14.9	30	11.3	32	19	6	-11	-30
19	14.6	26	11.1	27	15	4	-13	-31
20	15.4	21	11.6	23	15	6	-8	-25
21	17.7	18	14.0	21	17	11	0	-12
22	20.6	16	15.6	18	18	15	8	-1
23	22.9	15	17.5	16	19	17	11	4
24	23.9	14	18.7	14	18	17	13	6

VK SOUTH — SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	20.2	17	16.3	22	20	15	6	-5
2	20.4	17	16.8	22	21	15	6	-4
3	20.3	17	16.7	23	21	16	6	-4
4	20.2	18	16.6	25	22	16	6	-5
5	20.0	19	16.3	27	23	16	6	-5
6	19.7	21	16.0	30	24	17	6	-7
7	19.3	23	15.7	34	26	18	5	-8
8	18.6	26	15.1	38	27	17	3	-12
9	17.7	27	14.2	37	26	14	-1	-18
10	16.7	28	13.4	36	23	11	-6	-25
11	15.8	29	12.7	35	20	7	-11	-32
12	15.1	30	12.1	33	18	3	-16	-38
13	14.6	30	11.6	32	15	0	-21	...
14	14.1	31	11.1	30	13	-3	-25	...
15	13.5	31	10.5	28	10	-7	-31	...
16	12.9	32	9.8	26	6	-12	-37	...
17	12.3	32	9.4	24	2	-17	...	...
18	12.0	31	9.1	21	0	-19	...	...
19	12.7	24	9.5	20	3	-13	-37	...
20	14.5	20	10.7	21	10	-2	-20	...
21	16.8	19	12.7	22	16	7	-6	-22
22	18.7	18	14.3	23	19	12	1	-12
23	19.6	17	15.3	22	20	14	4	-7
24	20.1	17	15.9	22	20	15	6	-5

VK WEST — EUROPE

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.6	13	9.0	9	-4	-19	...	...
2	10.7	4	8.4	3	-8	-23	...	...
3	10.7	-3	8.4	1	-7	-19	-39	...
4	13.0	0	9.8	1	-1	-9	-22	-38
5	17.2	3	13.7	-1	3	1	-6	-16
6	21.7	6	17.4	-4	5	6	3	-3
7	24.9	7	20.1	-7	5	8	7	3
8	27.1	8	22.0	-7	6	9	9	6
9	27.0	10	22.0	-6	7	11	11	8
10	26.2	11	21.3	-2	10	12	12	8
11	25.2	12	20.9	5	14	15	13	8
12	24.0	15	19.4	17	20	19	14	8
13	22.9	19	18.4	28	26	22	15	7
14	22.0	22	17.5	35	30	24	15	5
15	21.3	22	17.0	36	29	22	12	1
16	19.2	22	15.7	35	25	16	4	-10
17	17.0	24	13.2	32	20	9	-6	-23
18	14.8	26	11.4	28	13	0	-19	...
19	13.5	27	10.3	24	7	-8	-30	...
20	12.5	27	9.6	21	2	-15	...	...
21	12.0	28	9.1	18	-1	-20	...	...
22	11.8	28	9.2	18	-3	-22	...	...
23	12.1	25	9.2	17	-1	-19	...	...
24	12.2	19	9.4	14	-1	-16	-39	...

VK WEST — USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	21.4	6	16.1	-8	4	6	4	0
2	19.0	6	14.3	-3	5	5	1	-5
3	16.8	5	12.6	1	6	4	-2	-12
4	15.3	7	11.5	5	7	2	-7	-19
5	14.4	9	10.8	9	7	0	-11	-25
6	13.7	13	10.2	13	7	-1	-15	-32
7	13.2	17	10.0	16	7	-3	-19	-39
8	13.2	22	9.9	20	9	-3	-21	...
9	13.1	27	9.9	24	10	-4	-24	...
10	12.1	30	9.2	23	6	-10	-33	..
11	10.7	32	8.2	18	-3	-23	...	..
12	10.6	33	8.2	18	-3	-24	...	...
13	13.5	30	10.1	28	13	-1	-21	...
14	17.3	29	13.4	37	27	17	4	-10
15	14.3	27	11.0	27	16	4	-11	-29
16	13.9	21	10.7	21	12	2	-13	-30
17	16.1	17	12.4	17	15	9	-1	-14
18	15.3	10	11.7	9	10	5	-4	-16
19	14.8	4	11.2	3	6	2	-6	-17
20	15.6	2	11.8	-2	4	3	-3	-12
21	18.1	3	14.2	-7	3	4	1	-5
22	21.1	5	16.0	-13	2	5	5	1
23	23.5	7	18.1	-15	1	6	7	4
24	24.2	7	18.3	-13	2	7	7	3

HAMADS

TRADE ADS

● AMIDON FERROMAGNETIC CORES: For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please ... 14 Boanyo Ave Kiama). Agencies at: Geoff Wood Electronics, Sydney: Webb Electronics, Albury: Assoc TV Service, Hobart: Truscotts Electronic World, Melbourne.

● WEATHER FAX programs for IBM XT/ATs *** "RADFAX2" $35-00, is a high resolution shortwave weatherfax, morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSB HF radio and RADFAX decoder. *** "SATFAX" $45-00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver. *** "MAXISAT" $75-00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) plus documentation, add $3-00 postage. ONLY from M Delahuntly, 42 Villiers St, New Farm QLD 4005. Ph (07) 358 2785.

FOR SALE ACT

● YAESU FT107DM tcvr with FV107 VFO FC107 ATU $800; YAESU FT212RH 2m tcvr $400; YAESU FT207R 2m handheld with all accessories $150; KENWOOD MC60A microphone $70. All in cartons with manuals. Greig VK1BSM (06) 231 5765.

● ATU MFJ-949B internal SWR meter, up to 300W, as new $165 O.N.O.; multi-band vertical (80-10m), Werner Wolf, handles 2kW, used only once, cost $299, sell $145 O.N.O. Bob VK1BOB (06) 295 3707 A.H.

● IC751 HF transceiver $1550 ONO; IC731 HF transceiver (same as IC735) $1650 ONO; AMIGA 2000 computer 3Mb RAM, twin drives, 1081 colour monitor $950 ONO. Markus VK1SK QTHR (063) 31 1136.

FOR SALE NSW

● ADVANCE 10MHz dual trace oscilloscope with probe s/n 00590 $300; SANSEI mini AF generator 10Hz-100KHz $50; VZ200 Computer with 16K RAM module and data cassette recorder $50. L. A. Brill, 32 Moore St, Ganmain NSW 2702, (069) 27 6406.

● YAESU FT101ZD HF xcvr, exc cond $650; HEWLETT PACKARD 2382A RS232 terminal with manuals $35; J-38 Telegraph key $25; PAKRATT 232 with Commodore 64 and interface $600. Kirt VK2DOJ (02) 436 2618.

● GULBRANSON upright radio with early 78 player about 1928-30 working order; EARLY Horn radio with power supply working order; 5 EARLY empty wood cabinets would use Horn speakers about 1926; PHILLIPS original multi tap power supplies; EMMCO original multi tap power supply; ANOTHER early Horn radio 99% complete about 1926-30; TWO Kriesler mantle bakelite radios (brown) working order; SOME early test equipment & other parts. All items cash NO CHEQUES. Please call day or evening. A. Walsh VK2TBW (048) 61 2092 or fax (048) 61 1536.

● QUANTITY brand new 807 valves in cartons, Chelmer brand (UK) $5.00 each plus postage. Craig VK2XRL, PO Box 290, Bowral NSW 2576, (018) 48 4589 AH.

● COLLECTORS item, COLLINS 75A-3 with manual $250; SIGNAL generator 10-500 MHz $450; DEVIATION/MOD meter $250. John VK2BJU (02 673 4305 evenings.

● KENWOOD TS440S tcvr c/w, mic, handbook, voice synthesizer in original carton vgc $1800; KENWOOD TH77A dualband h/held tcvr 2m/70cm fm as new complete $550. Peter VK2APP QTHR (063) 83 6206.

● COLLECTORS item Fluke DMM 8030A c/w SAFT nicads plug pack operational may need minor work suit technical type no leads full workshop manual $110 incl freight. Dogger VK2KSD QTHR (066) 77 9292.

FOR SALE VIC

● ICOM IC751 HF tcvr s/n 01309 with PS35 inbuilt mains psu and SM8 desk mike; ALSO AT500 ATU s/n 05255. Best offer. Tom VK3XBG QTHR (051) 94 2240.

● YAESU FT901DM Deluxe transceiver, 10 bands, digital readout, memory, 180 watts CW; ALSO SSB FSK AM and FM; PAIR 6146 final, built in Curtis keyer, filters, A.C. and 12 volt power supplies, instruction and service manuals included $900; YAESU TO901 Multiscope (tx and rx) matches the above $250. Both units in unmarked condition ex deceased Ham. Enquiries G. Lance VK3DS QTHR (053) 32 3226.

● ALINCO DJ-500T dual band 2m/70cm handheld xcvr with charger, Mic/spkr, original box, EC $425. Ron VK3OM QTHR (059) 44 3019

● ICOM IC701 6 band digital broadband transceiver with twin vfo's, vox, swr etc. Fully maintained, unmarked and in original box with instruction manual $850; ICOM IC701 ps heavy duty A.C. power supply and speaker, matches above, in original box and unmarked; ICOM microphones (desk and hand), cables, extension terminal and 100kc crystal marker $100. All would suit a new buyer and less than half the cheapest new unit price. G. Lance VK3DS QTHR (053) 32 3226.

● YAESU FRG-7 all band com/rx with manual $225. Jim VK3BCV QTHR (054) 60 4048.

● YAESU FRG-9600 all band all mode VHF/UHF scanning receiver little used, as new condition, half new price $490. H. Virgo VK3DVY (052) 21 6804.

● TH3JR good condition $125 ONO. Jim VK3BCV QTHR (054) 60 4048.

● KW2000E Transceiver s/n E377 ssb/cw vacuum tube HF bands c/w handbook circuits and matching mains power supply s/n E339 $100; YAESU FRG-7 wadley loop comms receiver s/n 7K 140477 c/w handbook circuits $250. O.B.O. Des VK3EDB QTHR (03) 836 1837.

● STRAIGHT Morse code key hi-mound HK707 excellent condition $50. Jack VK3MGE, 26 Thorpdale St, Newborough Vic 3825.

FOR SALE QLD

● SHIELDED room by Belling Lee, size 2500mm wide, high & deep. Includes 2 mains filters, light fitting & work bench. Disassembled but complete with all floor, wall & ceiling panels including a vent panel and a fingered-door panel. Will consider best offer. Gary VK4AR QTHR (07) 353 1695.

● HF LINEAR components QB3.5/750, 2 x 7129, 4 x 572B, 2 x 2.5/300 new tubes; VACUUM variable capacitors; ROLLER inductor; CERAMIC bandswitches. Sell or exchange for Heathkit or Yaesu station monitor, manual "Bug" morse keys, 2m gear etc. Doc VK4CMY (076) 85 2167 (AH).

● YAESU FL2500 linear 2000w s/n 503011 purchased overseas $650; NEW matched 6KD6 valves five $100; HEATHKIT SB200 Linear 1200w s/n 06351 purchased overseas $600; NEW matched pair 572B USA made $275; HAMII rotator plus 40m 8 core cable control box $450 O.N.O. Robby VK4YV QTHR (074) 43 8414.

● YAESU FT757 GX with HIGHMOUND morse paddle keyer, good condition $850; KENWOOD TS440S with auto ATU $1500. Geoff VK4ANP (074) 66 5476.

● RACAL RA217D com receiver good order $300; HP 608D sig gen 10-420mcs $100; YAESU FTDX560 tcvr good goer $250. Herb VK4KM (071) 64 2202.

● IC-725 HF all band transceiver $800; ICOM AH3 antenna tuner $400; PK-232 MBX data controller $500; PRIMAGE 90-GT printer $80; ROTOR Daiwa DR-7500 100 met cable $300; W G WULF 10 & 15 m.duo-band beam antenna $150; TOWER 21 metre home brew $300; POWER Sup home brew 25 amps $100. J. Gacesa VK4MEA (07) 271 2692.

● ICOM IC-720 c/w IC-PS15 p/s, KENWOOD Antenna tuner AT-130, OSKER SWR-200 and hamtenna M20.1, will not separate $800 the lot. L. Ferris VK4CAF (070) 53 6492.

● KENWOOD TS-680S HF & 6m transceiver and AT-250 auto ATU ec $1500; KENWOOD TM-741A full-featured fm multibander 2 mtrs, 70 & 23cmtr transceiver ec $1450; ALINCO Power supply 25A continuos $330. All items with original boxes and manuals, serials nos. Eric VK4NEF QTHR (07) 395 5327.

● CREED Teleprinter model 54, original, complete with dialler/PSU and manual, best offer for this collector's item; SHURE model 450 Desk microphone w/data sheet. v.g.c. $85 or exchange ICOM SM8 Desk Mike; ARA Issue 1 of Vol 1 and many later issues. Collector's item. Best offer; MOSLEY HF trapped vertical antenna w/radials, data sheet $90; DSE PSU 13.8v, 25A peak cap $150; SIDEBAND SE-502 10m base station, with circuit diagram, conversion info and Xtals for re-conversion to 11M $90. John VK4SZ QTHR (070) 61 3286.

● DECEASED ESTATE KENWOOD TS680S HF + 6m in original packing, manual, mike, leads, limited use $1450. Alan VK4FSI (074) 93 3665.

FOR SALE SA

● YAESU FT7B HF xcvr $450; YAESU FT709R 70cm h/hald c/w FNB3 nicad $250; KENWOOD AT-230 ATU $230. All in ex cond, orig packing, manuals etc. Terry VK5ATN QTHR (088) 63 1268.

FOR SALE TAS

● TS-440S clean condition little use c/w handbook and microphone. All in original carton $1600. Vic VK7VK QTHR (002) 57 8471.

● ICOM Transceiver IC-22A with IC-3PA power supply, both have manuals $170; YAESU FRG-7 receiver, vgc with manual $300; SUPER 80 computer with green screen monitor, tape drive, over 50 tapes of software, complete with technical and programming manuals and Z80 reference manual $150. Peter VK7KPB (002) 28 4110.

WANTED ACT

● FORTRAN compiler for antenna modelling on IBM pc. Dave VK1DT QTHR (06) 295 1874.

WANTED NSW

● YAESU FT990 or FT767GX or Kenwood 930 or 940. Alex VK2ALX (02) 907 9073 (AH).

● MILITARY radios type AR-17, 108, 109, 208, 11, 19, 22, B-40, R 1155, T 1154, Hallicrafters S-27 and/or S-27D; VALVE Tester — RCA WT-110A any condition; CIRCUIT Diagrams and/or manuals for the above sets and for B-41 rcvr; ACE radio wideband oscilloscope; AWA gated amplifier type A55765; AEI HV Power supply type R1103A. Photocopies OK. John Farmer (02) 888 9411 BH/AH.

● KINGSLEY radio AR7 speaker assembly for restoration, if not available would consider complete radio or parts of same. Grahame Foster (049) 49 8484.

● LINEAR amplifier for HF Q WARC not essential but must be in vg condn, top US brands preferred; PLATE transformer heavy duty suit psu linear also vacuum caps 1000pf; SWAP pair Amperex 4CX350F/8322 unused and cartoned for pair 4-400A or single 4-1000A, would also consider exchange for heavy duty 1500v-3000v plate transformer. Ron VK2ARJ QTHR (066) 53 6509.

● RADIO Vibrator oak type V5124 RAAF part number vibrator type C Y10D/70264 for museum project AR7 restoration. Stan Dogger VK2KSD QTHR.

● SERVICE Manuals/copies for H/P 5328A counter; KEITHLEY 104 w/band amplifier; FAIRCHILD TS452A/U; BALLANTINE 420 ac/dc calibrator; LEADER LSG221signal generator; BWD 112 signal generator; TRIO CO-1303A CRO. Will pay costs. Richard (063) 61 8529.

● WANTED BY Collector old & new morse keys. Magazines, books relating to morse code. Need as much material as possible for future book. Top prices paid. Steve VK2SPS (02) 99 2922 after 6.00 pm.

WANTED VIC

● NO 19 Military transceivers for Stuart Tank restoration, going or not going, also require manuals, headsets, mikes, power supplies etc. Eric Gibson VK3BEG, Churchill Vic (051) 22 2190.

WANTED QLD

● AR MAGS, tech books, data books, hand books anything related. Paul VK4YFF (070) 31 7895.

● POWER transformer for Telequipment servscope model D33. Fred VK4ZU QTHR (074) 97 4159.

● ICOM SM5 in vgc or SM8 desk mike; FL30, FL45 Filters; TOSHIBA T1200HB mother board in working order. John VK4SZ QTHR (070) 61 3286.

● TWO METRE mult mode tcvr base or mobile FT290R or similar — will consider ICOM 22S must be good condition. Gordon VK4KAL QTHR (079) 85 4168.

WANTED SA

● COLLINS KWM380, 75S3B, 32S2B, R390A/URR, R392/URR. Josef VK5QQ QTHR (08) 263 6377.

WANTED WA

● INTRUDER WATCH observers in VK6. Please help, free postage, logs, envelopes, advice. Our Division support intruder watch. Please support us. Thank you. Graham VK6RO Co-ordinator for WA QTHR (09) 451 3561.

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